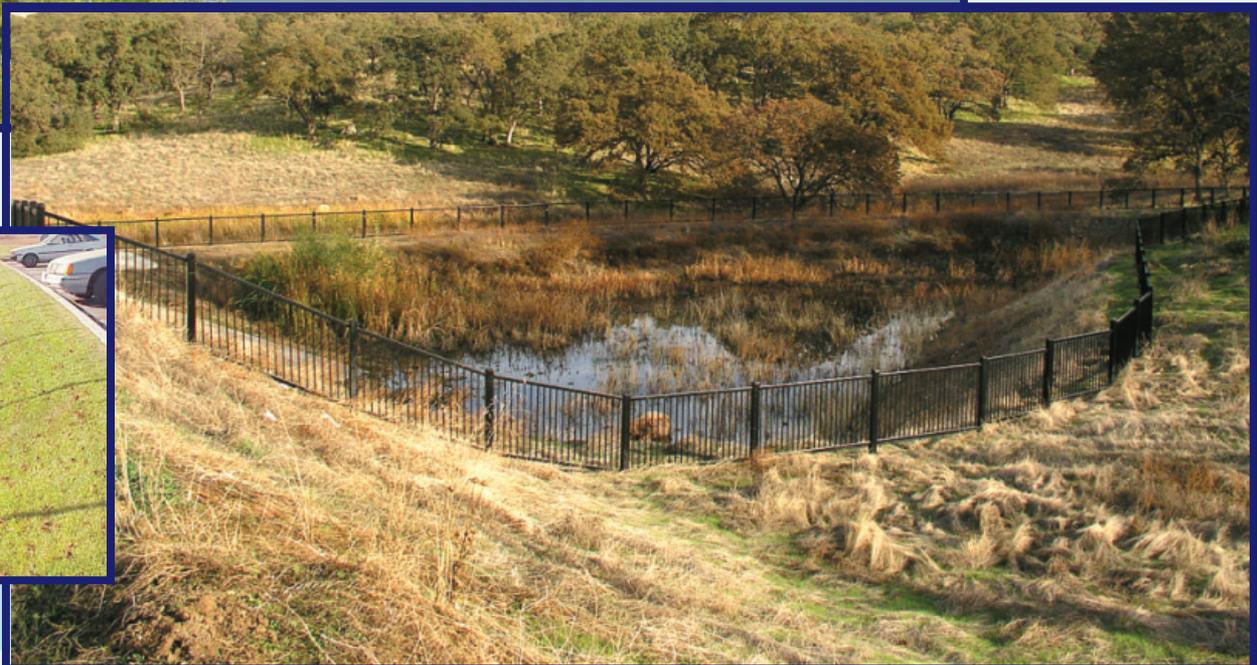


Sacramento Stormwater Management Program

Development Standards Plan

December 1, 2003

Prepared by: County of Sacramento, City of Sacramento, City of Citrus Heights, City of Elk Grove, City of Folsom, City of Galt



Submitted to:

State of California Regional Water Quality Control Board, Central Valley Region, 3443 Rautier Road, Suite A, Sacramento, CA

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Management Program

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Chapter 1

Introduction

Purpose and Organization of the DSP

The Development Standards Plan (DSP) was prepared jointly by the Permittees in the Sacramento Stormwater Management Program: the County of Sacramento and the cities of Citrus Heights, Elk Grove, Folsom, Galt and Sacramento (Permittees).^{1,2} It describes measures to reduce stormwater pollutant discharges from new development and significant redevelopment. The document is required by National Pollutant Discharge Elimination System (NPDES) Stormwater Permit No. CAS082597 (Order R5-2002-0206) (Stormwater Permit) issued to the Permittees in December 2002 by the Central Valley Regional Water Quality Control Board (Regional Board).

The DSP is intended to:

- Describe the status of development in Sacramento County
- Provide an overview of the development review process and describe the various development review tools used to condition projects to include stormwater quality controls
- Describe the development standards currently implemented by the Permittees
- Compare the existing development standards to the requirements of the Stormwater Permit to verify compliance

- Recommend amendments to existing development standards, as needed, to better address the Stormwater Permit requirements
- Describe the proposed implementation process and schedule for amending the standards

The term “development standards” is used throughout this document to refer to the plans, policies, codes and design standards that the Permittees use to review and condition development proposals to include stormwater quality controls.

Following this Introduction, the DSP is organized as follows:

Chapter 2 – Status of Development and Redevelopment in Sacramento County

Chapter 3 – Overview of the Development Review Process

Chapter 4 – Tools of the Development Review Process

Chapter 5 – Existing Development Standards

Chapter 6 – Proposed Amendments to Key Development Standards

Chapter 7 – Proposed Amendments to Other Development Standards

Chapter 8 – Development Standards Implementation Process

Appendix A includes a glossary of commonly-used terms and acronyms, and the remaining appendices present supplementary or background information.

Relevant NPDES Permit Requirements

Appendix B outlines the provisions of the Stormwater Permit pertaining to development standards. The Stormwater Permit requires the Permittees to compare their existing development standards to “the requirements established under

¹ The City of Rancho Cordova incorporated in July 2003 but has not yet been named a Permittee by the Regional Board and did not formally participate in the process to prepare the DSP. The City adopted all of the County plans, codes and design standards upon incorporation and the County provides stormwater and drainage service to the City. Therefore, information presented for the County also applies to the City.

² The City of Isleton is located within the county but is not a permittee due to low population.

State Water Resources Control Board (State Board) Order WQ 2000-11 and/or other applicable directives.” Also, the proposed modifications to the development standards must ensure consistency “with the requirements of State Board Order WQ 2000-11 and [the Stormwater Permit].”

Order WQ 2000-11 specified the contents of Standard Urban Stormwater Mitigation Plans (SUSMPs) to be prepared by agencies in Los Angeles County for controlling stormwater pollution from new and redevelopment. Following the issuance of WQ 2000-11, Craig Wilson of the State Water Resources Control Board (State Board) issued a memorandum, dated December 2001, which required all nine California Regional Boards to include similar language in all new NPDES stormwater permits issued in the state. Hence, the Stormwater Permit issued to the Sacramento Permittees in December 2002 incorporated all applicable language from WQ 2000-11. By complying with the provisions of the Stormwater Permit, the Permittees are addressing all applicable requirements of WQ 2000-11. Appendix C contains a copy of the December 2001 Wilson memorandum.

DSP Preparation Process

Preparation of the DSP began in January 2003 when the Stormwater Permit became effective. The Permittees decided to collaborate on the effort, since there is a need for consistency in development standards throughout the county. Additionally, although the Stormwater Permit allows the City of Galt to submit its DSP later, Galt opted to proactively join with the other Permittees in submitting the DSP on December 1, 2003.

The following summarizes the work completed to prepare the DSP:

- The Permittees selected a consultant team to conduct studies and prepare several technical memoranda that form the basis of recommendations made in the DSP.

- Each Permittee agency reviewed and assessed its planning policies and procedures, in comparison to the principles recommended by the Stormwater Permit (Provision 16a). A uniform set of tables was used to ensure consistency among the Permittees.
- The Permittee steering committee (County and cities of Folsom and Sacramento) facilitated numerous Permittee coordination meetings throughout the year-long DSP preparation process and coordinated review of the consultants’ technical memoranda. In addition, each agency conducted its own in-house meetings with planners and engineers.
- The County made a presentation to the development community regarding the DSP process on behalf of all the Permittees.

Stakeholder Involvement

Permittees

All six Permittees worked together throughout 2003 to prepare the DSP, as described above. Each agency involved engineers and planners from various departments in the process to review and assess existing development standards. The Permittees will continue to collaborate in 2004 and beyond to amend and implement development standards.

Development Community

The development community (local engineering, construction and development firms) has often mentioned to the Permittees its desire to have the development and stormwater design requirements clearly defined and consistently applied throughout the County. The development community is a key stakeholder in the DSP implementation process.

In March 2003, the County of Sacramento made a presentation to the Sacramento Area Council of the Building Industry Association (BIA) to update the BIA members about the new Stormwater Permit issued in December 2002 and resultant impacts to the local development community (e.g., adoption of amended development standards). About 30 building industry representatives were present. After the meeting, several BIA members expressed an interest in participating in a small working group to meet with the Permittees during the DSP implementation process.

The first meeting with the BIA working group is expected to be held after the DSP is submitted to the Regional Board on December 1, 2003. The purpose of the meeting will be to review the findings and recommendations in the DSP and encourage the BIA to participate in the Regional Board's public review process for the document. Additional meetings may be held with the working group after the DSP is approved by the Regional Board and the Permittees have begun the work of amending development standards. This part of the process will have the greatest impact on the development community, since it will result in code changes and new standards/requirements for development and redevelopment in the Sacramento area.

Environmental Community and Interested Parties

The environmental community and other interested parties will be notified by the Regional Board of the availability of the DSP for public review sometime after the document is submitted on December 1, 2003. Additionally, public notice will be given when each Permittee intends to adopt amendments to its existing general and community plans, codes and/or design standards.

Chapter 2

Status of Development and Redevelopment in Sacramento County

Unincorporated Sacramento County

Sacramento County encompasses six cities, including Sacramento, Citrus Heights, Elk Grove, Folsom, Rancho Cordova, and Galt. The unincorporated area is 994 square miles, with a population of approximately 1,258,600, according to the 2000 Census.

The planning environment in which Sacramento County operates has changed dramatically since the adoption of the 1993 *County General Plan*. Three new cities have incorporated — Citrus Heights, Elk Grove and Rancho Cordova — and the older cities of Sacramento and Folsom are looking to expand their Spheres of Influence. The unincorporated area has also witnessed an accelerated development of agricultural land and open space due, in part, to lower than planned residential densities in areas designated for new urban growth.

Sacramento County is in the process of updating its General Plan to help guide growth and development of the unincorporated area through the year 2025. During that process, the County will evaluate the impact from recent incorporations, determine its share of the anticipated regional growth, and evaluate how best to accommodate growth while protecting resources. For example, the County plans to evaluate smart growth principles, include strategies to attract reinvestment in aging communities, and update existing programs, including, but not limited to: air quality, circulation, tree preservation and mitigation, design guidelines, stormwater quality, open space and conservation.

Two Urban Growth Areas have been identified for the unincorporated area:

- 1) **Florin-Vineyard Gap Project** — a primarily low-density residential area of about 2,000 acres, and a light-industrial area of about 1,000 acres situated east of Highway 99, south of Highway 50 and west of Grant Line Road
- 2) **Elverta Specific Plan** — about 1,200 acres in northern Sacramento County, with a mix of low density and agricultural-residential land use

The City of Rancho Cordova incorporated on July 1, 2003. However, since the City adopted all of the County plans, codes and standards, the County requirements related to stormwater quality continue to apply to new and redevelopment in the area served by the new city. The population of Rancho Cordova is approximately 53,613 (2000 Census), and the city is approximately 26.417 sq. kilometers. A major development (Sunrise-Douglas Specific Plan) is underway in the City and when complete in several years, will double the City's population.

City of Sacramento

The City of Sacramento is located near the western edge of the Sacramento metropolitan area, extending eastward from the confluence of the American and Sacramento Rivers to the foothills of the Sierra Nevada Mountains. During the past 20 years, the area has experienced rapid population growth, occurring primarily in the suburban areas lying between the Interstate 80 and Highway 50 corridors. The *City of Sacramento General Plan* covers the present 98 square mile area of the City of Sacramento

The City's population is projected to increase by 21.5 percent from 404,701 in 2000 to 515,502 by 2022. The projected population and household growth in the City will require approximately 47,168 new residential units between 2000 and 2022.

The City of Sacramento is characterized by urban development and well-defined neighborhoods. While vacant and underutilized land is found throughout the developed part of the city, the most substantial residential and commercial infill and redevelopment opportunities occur in the Central City, in outlying older neighborhoods, neighborhood commercial corridors, and near existing and future light rail stations. The Central City, South Sacramento, and North Sacramento community plan areas have the most projected infill housing units of all the plan areas of the City.

New growth areas are located in North Natomas and North Sacramento, Delta Shores and the Cosumnes River areas in the south of the City, the area east of Power Inn Road, the Railyards Special Planning District in the Central City, and the Curtis Park West Railyards site. While all of the new growth areas will generate significant amounts of new development, the North Natomas Community Plan area is projected to account for 35 percent of new housing and 30 percent of new jobs in the City.

City of Citrus Heights

Citrus Heights is located in the northern part of Sacramento County, near the Placer County border. The City's population is almost 90,000 with a land area of just over 14 square miles. Most of the area was developed in the mid to late 1900s and the city incorporated in 1997. Following completion of the Stock Ranch project in 2004, the city will be largely built-out with primarily residential and some commercial land uses and only about 400 acres of developable vacant land. Future projects will be mostly redevelopment and infill construction on vacant or rezoned lots.

City of Elk Grove

Elk Grove is located in the southern part of the Sacramento metropolitan area west of the Cosumnes River, and is bounded by Calvine Road on the north and Kammerer Road on the south. Elk Grove incorporated in July 2000. In the near future, the City will be annexing the Laguna West area, which will make I-5 the city's westerly boundary. This annexation will bring the total incorporated area to just over 42 square miles with an estimated 2005 population of approximately 120,000.

Tremendous growth is now occurring in Elk Grove, particularly with residential and commercial land uses, and the population is expected to climb to approximately 140,000 by the year 2010. Most of the land within Elk Grove is urban or destined for urban land use in the near future. Development is primarily occurring on the southwest and east sides of the city, and redevelopment is expected in the future in the Old Town Specific Planning Area and various other locations.

City of Folsom

Folsom is located 22 miles northeast of the City of Sacramento along the Highway 50 corridor in Sacramento County. The 25-square mile city straddles the wooded banks of the American River and includes Folsom Lake and Lake Natoma within its boundaries. Possible future annexation plans include the land south of Highway 50, currently included in unincorporated Sacramento County. Most of the new development in the city has occurred since 1990, when the city began expanding out from its historic location along the American River.

The population of Folsom was almost 57,000 in 2003 and is expected to reach about 70,000 by the year 2009. The city's large land areas are currently being developed on the hilly east side of the city in the Empire Ranch and Broadstone projects. Land use here is predominantly single family residential homes, with a few associated commercial retail centers. A new college is also being constructed on the east side of town. Infill development is occurring in several areas throughout the city, including the American River Canyon area north of the river.

City of Galt

Galt is a growing community located in Sacramento County about 30 miles south of the City of Sacramento. The city is surrounded by extensive agriculture (mainly dairy and feed crop). The greatest use of land in Galt is for residential purposes. The current population is about 22,300 with a projected population of 30,000 at build-out of the current City limits. Seven percent of the city is designated as industrial with a minimal but growing number of industries. Commercial uses encompass 15 percent. Currently, approximately four square miles of the city are developed and future development will expand this to about five square miles. New development is occurring primarily in the northeast and southern portions of the City, while a relatively small amount of infill and redevelopment will likely continue in the western section of the City.

Chapter 3

Overview of the Development Review Process

Figure 3–1 is a flowchart showing the typical steps used by each Permittee agency to review and approve development proposals that require City Council/County Board of Supervisors approval. City Council/Board approval is required whenever a development project requires a discretionary entitlement such as a rezone, a tentative subdivision map, or a variance. Various departments within each Permittee agency review such projects and prepare a set of conditions of approval that include stormwater quality requirements, for consideration by the Council/Board.

When a project is proposed, the planners in each Permittee agency generally have the first contact with design professionals representing the developer. This initial consultation about site layout and design is an ideal place to begin thinking about stormwater quality protection, and whether stormwater quality facilities will be provided at the project site or mitigation will be required.

After a developer has applied to proceed with the project, agency staff rely on routing lists, checklists and guidance materials to help them complete the various steps shown in Figure 3–1. For example, planners or environmental analysts in each agency use an “Initial Study Checklist” as the first step in the California Environmental Quality Act (CEQA) environmental review process for projects requiring such a review. The checklist is discussed more in the next chapter.

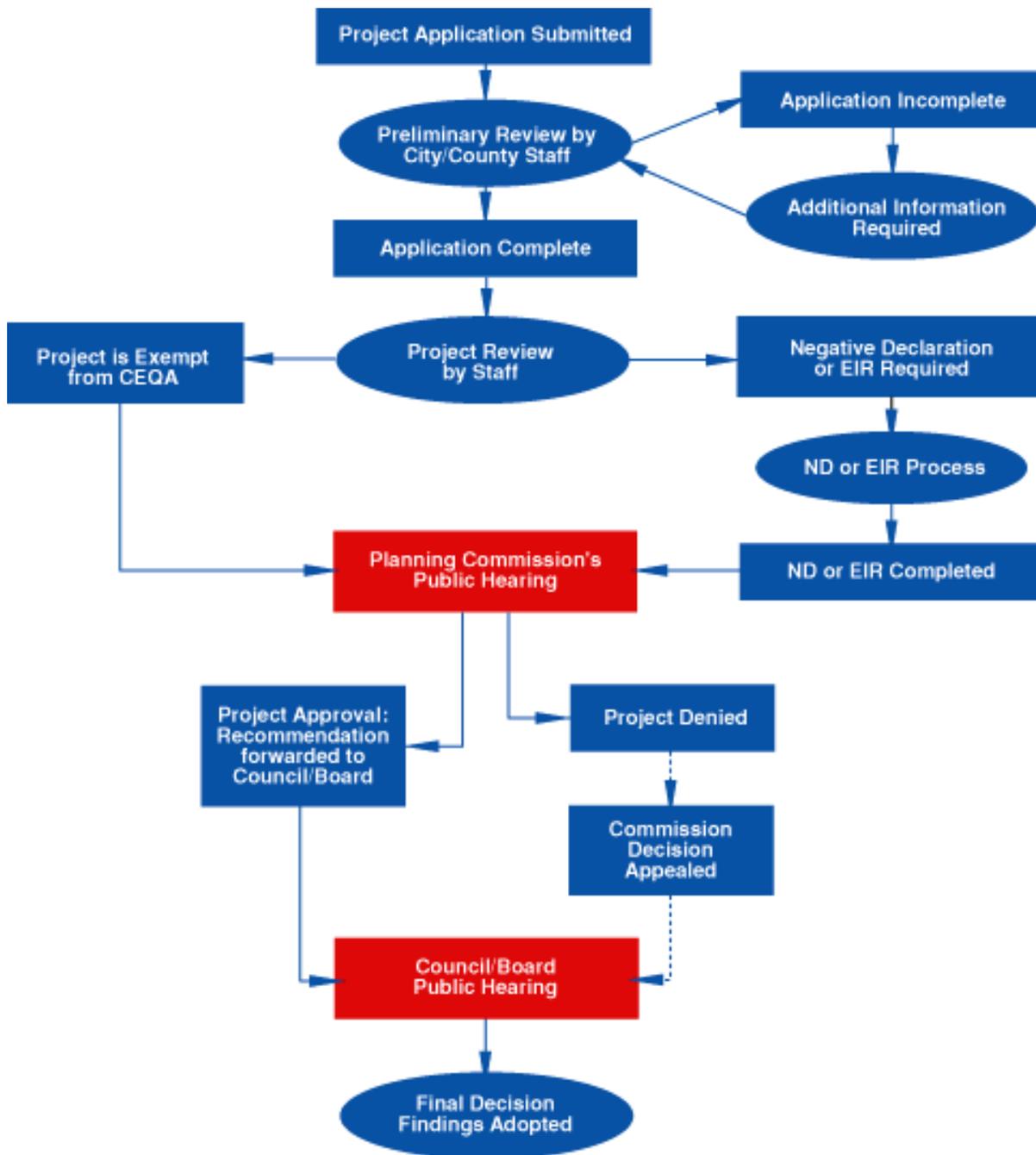
Once the permit application is complete, the project information is routed to various agency departments and staff for review. The staff place conditions on the project as needed utilizing a set of standard conditions, including one or more standard conditions that apply to protection of water quality. The agencies also conduct mandatory technical review meetings and subdivision review committee meetings to identify any technical, environmental, ordinance

or code problems and to finalize the appropriate standard conditions of approval for the project. Additional special conditions of approval may be imposed based on the findings in these meetings. As a result of the environmental review, many projects will have mitigation, monitoring and reporting plans (MMRPs) in which specific mitigation requirements and responsible implementing entities are identified.

When the project has obtained the necessary entitlement and moved into the permitting phase, plan check staff from each agency ensure that all the conditions of approval and those specified in the MMRP are satisfied.

Certain projects — such as those just requiring a building permit — do not need Council/Board approval (ad ministerial projects). The process shown in Figure 3–1 does not apply to these projects. However, plan check staff in each agency review these projects for conformance with applicable stormwater quality requirements outlined in agency codes, improvement standards and/or design and procedures manuals.

Figure 3–1. Typical Development Project Flow Chart



Legend: CEQA: California Environmental Quality Act; ND: Negative Declaration; EIR: Environmental Impact Report.

Note: Legal procedures may vary. Negative declaration and EIR documents vary in processing time.

Source: Figure 1 from "The Planning Commissioner's Book", Governor's Office of Planning and Research, May 1998.

Chapter 4

Tools of the Development Review Process

The Permittees use three levels of tools to oversee development and redevelopment:

- Plans, policies and review procedures
- Ordinances and codes
- Design standards and guidelines

Plans and policies present an overall community vision. The Permittees implement that vision by adopting codes which establish the local regulation/law. Following this, the agencies publish design/improvement standards and guidelines that lay out the additional design and engineering requirements that the development community must follow. This chapter discusses each of these levels of tools and focuses on their general application with respect to minimizing the effects of development on stormwater pollution and receiving water quality.

The requirements of the Stormwater Permit are primarily implemented through the third level of development tools — the design standards and guidelines, and those are the focus of this document. However, since the Permit also requires a review of plans and codes, those are discussed as well.

Plans, Policies and Review Procedures

General Plan

The General Plan is a community's blueprint for future development. It is adopted by the City Council or County Board of Supervisors and forms the basis for future land use decisions in the jurisdiction. A General Plan consists of at least two parts. There is written text describing the community's goals, objectives and policies toward development. There are also maps illustrating the generalized distribution of land uses, municipal service improvements (e.g., roads) and open space. California law requires that the General

Plan contain several elements addressing a set of basic planning issues. Watershed protection and water quality and quantity management principles and policies are typically included in one or more of the following elements:

- Land Use Element
- Conservation Element
- Open Space Element

Each of the Permittees has an adopted General Plan, which will be amended to reflect water quality principles as needed during the next update process, as described in Chapter 7.

Community and Specific Plans

Community Plans and Specific Plans provide direction for a community, portions of jurisdictions, or other defined geographic areas. These plans help implement an agency's General Plan on an area-specific basis and reflect the needs and constraints of that area. The plans typically set forth policy and implementation strategies for such items as land use, transportation, urban design, parks, school facilities, and public services. Environmental considerations unique to the designated area (e.g., protection strategies for a creek traversing the area) could also be defined in the plans. A Community Plan for a developed, mature area might focus on neighborhood enhancement and commercial revitalization goals and action items and infrastructure financing. A Specific Plan or Community Plan for an area that is newly developing would focus more on new development needs, location of new public facilities and infrastructure financing.

Natural/Scenic Area Protection Plans

Several of the Permittees have adopted plans to provide policy direction for resource conservation, recreation use and development within a

designated natural, riparian or scenic area. These plans may get incorporated into an agency's General Plan. For example, the City of Folsom has adopted the Humbug/Willow Creek Parkway Plan, and the City and County of Sacramento collaborated on the creation of the American River Parkway Plan and the associated River Corridor Management Plan. Another example is the Natomas Joint Vision, in which the City and County are developing an agricultural/open space and resource conservation plan.

Parks and Trails Master Plans

All of the Permittees have master plans adopted by various agencies and parks districts with jurisdiction within their municipal boundaries. Many times, existing and proposed parks and trails are adjacent to creeks and other natural areas that provide water quality and habitat values.

Drainage Master Plans

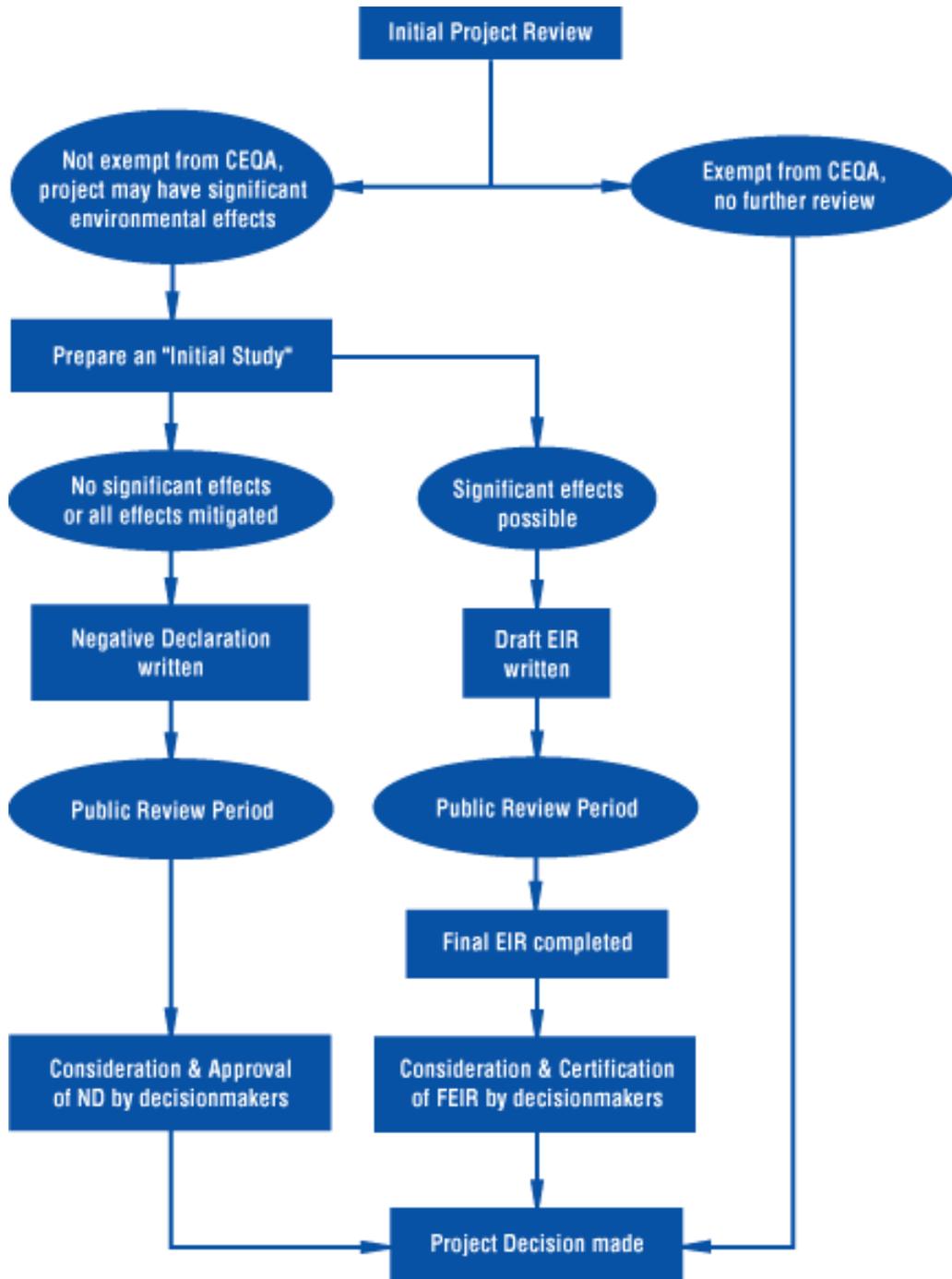
Drainage master plans are prepared by the Permittees for watersheds or specific planning areas that will be developed in the near future. Additionally, some Permittees (e.g., Citrus Heights and Folsom) are planning to prepare city-wide drainage master plans. The master planning process involves conducting hydrologic and hydraulic computer modeling to ensure that the existing or planned drainage features provide an appropriate level of service and flood protection for existing and future communities. In recent years, due to evolving environmental regulations and community interest, the focus of drainage

master plans has expanded to include protection, enhancement and/or creation of water quality, habitat, recreational and visual values. In developed/established areas, the master planning process can help identify problem areas in creeks (e.g., erosion prone areas and areas with poor water quality or aesthetics), potential sources of these problems, and proposed projects to alleviate problems.

California Environmental Quality Act (CEQA) Review Procedures

CEQA requires local and state governments to consider the potential environmental effects of a project before making a decision on it. CEQA's purpose is to disclose the potential impacts of a project, suggest methods to minimize those impacts, and when an Environmental Impact Report (EIR) is prepared, discuss project alternatives so that decision makers will have full information upon which to base their decision. Figure 4-1 is a simplified CEQA flowchart outlining the steps in the process, including the types of environmental documents that might be generated for a project. The planners in the public agencies use various tools, including an "Initial Study Checklist" to verify that they have considered all the potential environmental impacts of a project. The checklist generally includes one or more items related to protection of natural watercourses and associated water quality and habitat. The initial study process allows planners and project applicants to discuss potential water quality impacts and probable mitigation measures.

Figure 4–1. Simplified CEQA Flow Chart



Legend: CEQA: California Environmental Quality Act; ND: Negative Declaration; EIR: Environmental Impact Report.
 Source: Figure 2 from "The Planning Commissioner's Book", Governor's Office of Planning and Research, May 1998.

Ordinances and Codes

The development community is required to follow local codes when developing or redeveloping land. The Permittees established and regularly amend their municipal codes by adopting ordinances. The Permittees have adopted several types of ordinances that indirectly or directly address water quality and watershed protection. The following example ordinances and codes are discussed in this section:

- Zoning
- Stormwater Quality and Discharge Control
- Erosion and Sediment Control
- Water Conservation
- Tree Preservation/Parking Lot Shading
- Hillside Protection
- Habitat Management/Conservation

Zoning Ordinance/Code

Whereas the General Plan describes land use in a broad sense, the zoning ordinance more specifically spells out the zone classification and associated allowable uses for each piece of property within the community. For each zone classification, standards such as minimum lot size, maximum building height, building setbacks and maximum lot coverage are specified. Before a building permit can be issued, the project proponent must demonstrate that the proposal complies with the applicable zoning requirements.

Zoning codes may contain requirements that directly promote water quality protection. For example, a zoning code may designate natural stream buffers, open spaces or erosion-prone areas that need special protection. Zoning codes can also indirectly affect water quality; for example, limits on lot coverage result in more vegetated areas to infiltrate and filter runoff and less impervious surface.

Conflicts may exist between zoning codes and the objectives of water quality treatment. For example, landscape requirements for parking lots might make it difficult to allow vegetated swales in the landscape areas between parked cars.

Stormwater Quality and Discharge Control Ordinance

Since the start of the Sacramento Stormwater Management Program in 1990, each Permittee has adopted a stormwater quality control ordinance. Such an ordinance typically:

- Describes/defines the municipal storm drain system covered by the ordinance
- Defines what is a “pollutant” and prohibits pollutants from entering the municipal storm drain system
- Provides authority to the municipality to pursue enforcement action against and issue fines to dischargers found in violation of the ordinance
- Authorizes the municipality to set requirements for stormwater quality control for construction and development projects and/or other regulated communities (e.g., industrial facilities)

Erosion and Sediment Control Ordinance

All of the Permittees regulate land grading and require erosion and sediment control during construction to minimize damage to surrounding property and public rights-of-way, water quality degradation, and disruption of natural drainage flows. Grading and erosion/sediment control ordinances establish administrative procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion, sedimentation and other pollutant runoff associated with construction.

Other Ordinances

Depending on their unique circumstances, the Permittees have adopted additional ordinances that directly or indirectly address the potential water quality impacts of development.

Implementation of these ordinances may promote water quality protection or pose a conflict with stormwater quality requirements. Here are some examples; see Chapter 5 and Appendix D for more details:

- *Water Conservation Ordinances* define standards and procedures for designing,

installing and managing landscapes to avoid high water demands and better withstand drought. Water conservation ordinances can benefit water quality, since they typically result in reduced runoff and less use of pesticides and fertilizers. However, such ordinances can also pose a conflict, where vegetated stormwater quality facilities require the use of extensive grass/turf for water quality treatment.

- *Tree Preservation/Parking Lot Shading Ordinances* recognize the values of trees (e.g., historical heritage values) and establish standards and measures for protecting them. While not mentioned in all tree preservation ordinances, trees also provide water quality benefits such as reduced surface runoff temperatures due to canopy shading, and filtration and adsorption of rain water and runoff to remove pollutants. (This benefit is recognized in the City of Sacramento's Parking Lot Shading Ordinance.)
- *Hillside Development Ordinances* are primarily intended to promote public safety and protect property against losses from erosion, ground movement and flooding, but can also protect significant natural features and prevent eroded materials from being discharged to the municipal storm drain system and receiving waters.
- *Wetland and Riparian Habitat Management or Conservation Ordinances* recognize the value of natural wetlands and riparian habitats and protect them from damage due to development or other land use activities.

Design Standards and Guidelines

Design standards and guidelines help ensure that the components of the public infrastructure (e.g., roads, drainage and sewer utilities, parks, public buildings) are designed and constructed consistently and of the highest quality.

Design Standards

The Permittees have published improvement standards or design/procedures manuals specifying design requirements for the public

drainage infrastructure, including post-construction stormwater quality BMPs. For example, the County and cities of Elk Grove and Citrus Heights use the same set of improvement standards which Galt also uses, the City of Sacramento has its *Utilities Procedures Manual*, and Folsom has its *Design and Procedure Manual and Improvement Standards* document. In addition, the City and County of Sacramento published two documents that include design standards and criteria for stormwater quality BMPs: 1) *Volume 2: Hydrology Standards of the City and County of Sacramento Drainage Manual (Hydrology Standards)*, and 2) the *Guidance Manual for On-Site Stormwater Quality Control Measures (On-Site Manual)*.

The *Volume 2* document addresses design of regional SWQ BMPs which serve large areas (typically 20-1600 acres), are located in the public right-of-way, and are owned, operated, and maintained by public agencies.

The *On-Site Manual* includes design information for on-site SWQ BMPs that each serve a particular project or site.

The *On-Site Manual* is implemented to various degrees by all the Permittees and includes information for both on-site source and treatment stormwater quality BMPs accepted for use in the Sacramento area. Source control BMPs are preventive practices or methods to control pollutants at their source and prevent pollutants from contacting Stormwater run-on or runoff. Treatment control BMPs are engineered systems or devices designed to remove pollutants from stormwater runoff through various means (e.g.; gravity settling, filtration, biological uptake).

Source control fact sheets are provided for such activities as waste handling, unloading/loading and fuel dispensing. The treatment controls currently addressed by the *On-Site Manual* include: vegetated swales and grass filter strips, sand filters, infiltration trenches and basins, and porous paving blocks. The *On-Site Manual* is discussed in more detail in subsequent chapters.

Design Guidelines

Several Permittees have elected to publish design guidelines for certain types of development. These include concepts and principles for planning and site design that primarily influence the aesthetics and livability of an area. Water quality protection principles can be integrated into such design guidelines. For example, this would be an ideal place to emphasize the need for designs that minimize impervious surfaces by protecting/adding vegetative areas and/or permeable pavement surfaces.

Chapter 5

Existing Development Standards

Development Standards Review Process

As part of the process to prepare the DSP, the planners and engineers in each Permittee agency compiled and reviewed the existing development standards used by their agency that are directly or indirectly related to water quality and watershed protection. This entailed reviewing plans and policies (such as the General Plan), codes and ordinances and design standards. In addition, a team of experienced engineering and planning consultants was hired to help with the planning review process by conducting engineering analyses and technical reviews related to stormwater best management practices (BMPs) and numerical sizing criteria for the BMPs.

The review was conducted to:

- Determine if the Permittees' current approach to managing stormwater quality impacts from development is consistent with the Stormwater Permit requirements
- Identify any policies, codes or standards that conflict with stormwater quality protection objectives
- Make initial recommendations to strengthen or update the existing policies, codes or standards if necessary

This chapter and Appendix D describe how the Permittees' current approach compares to the Stormwater Permit requirements; proposed amendments are described in Chapter 6. This chapter focuses primarily on the *City and County of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures (On-Site Manual)*, since that document contains most of the stormwater quality control information and requirements. Due to its name, it is perhaps not clear that the *On-Site Manual* is not only used by the City and County of Sacramento, but by all the Permittees. Also, the word "guidance" is misleading and has created a situation where some

of the Permittees are implementing the manual more comprehensively than others. The Permittees intend to make changes — such as changing the name of the document — to address these issues, as discussed in Chapter 6.

Comparison of Existing Development Standards to Stormwater Permit Requirements

Water Quality and Watershed Protection Principles (Provision 16a)

Stormwater Permit Provision 16a lists a set of eight water quality and watershed protection principles that each Permittee should consider in its General Plan and other documents.

Appendix D provides a summary of how each Permittee's existing planning/development review documents relate to those principles. In general, most of the Permittees already address the principles to some degree, but some feel that their policies, plans and codes could be strengthened or updated. Appendix E contains a proposed menu of tools that each Permittee could consider and refer to in the near future to help strengthen and update its plans and policies where needed. This menu was prepared by experienced planning and site design consultants based on input obtained during a Permittee workshop held in August 2003.

Priority Development Project Categories (Provision 19a)

Stormwater Permit Requirements

Stormwater Permit Provision 19a lists eight priority development/redevelopment project categories (based on land use and project size) for which — per Provision 19b — this DSP should recommend source and/or treatment control BMPs/requirements. The permit language for Provisions 19a and b can be found in Appendix B and is summarized throughout this section.

Permittees' Existing Requirements Related to Priority Project Categories and Comparison to Permit

The *On-Site Manual* used by the Permittees already outlines stormwater quality control requirements for various land uses. Specifically, Table 2–1 in the *On-Site Manual* outlines how various types of projects (based on generalized land use) should incorporate stormwater quality source and treatment controls. The land use categories in Table 2–1 relate to (but are not identical to) the priority project categories identified in Permit Provision 19a, as discussed below for each of the categories.

The *On-Site Manual* applies to both redevelopment and new development projects, and the requirements are the same for both. However, the *On-Site Manual* does not define redevelopment in the same way as the Stormwater Permit. Right now, each Permittee is free to interpret the term as they choose and there is likely inconsistency between the agencies.

Residential: Single Family Home Subdivisions (Permit Provision 19a.i)

Permit Provision 19a.i defines residential subdivisions of ten units or more as a priority project category, subject to source and/or treatment control BMPs. Table 2–1 in the *On-Site Manual* includes categories for single family and multi-family residential land uses, whereas the Stormwater Permit does not distinguish between the two. The Permittees believe it is important to maintain the distinction, since pollution prevention and BMP strategies for multi-family can be different than for single family development.

The Permittees already require source controls (e.g., “No Dumping-Drains to Creek/River” message stamped on new drain inlets) for *all* single family residential subdivisions, and require treatment controls for certain ones. The manual requires new single family residential subdivisions over 100 acres to include one or more regional controls (e.g., water quality detention basins) for treating runoff. However, in some cases, some permittees have gone beyond this level by requiring detention basins to serve smaller areas. The local agencies can require additional regional or on-site treatment controls

for subdivisions, beyond what is required in the *On-Site Manual*.

Table 2–1 in the *On-Site Manual* bases the trigger for requiring regional BMPs (e.g., detention basins) on the gross size of a project, not on the number of lots. (As stated previously, the Stormwater Permit’s trigger is ten or more lots). Gross size is probably a better trigger in Sacramento County, due to the variations in lot sizes, particularly with rural agricultural land uses (single family residential lots of 1, 2 and 5 acres each) in the eastern part of the county.

Residential: Multi-Family Development (Permit Provision 19a.i)

The Permittees already condition all multi-family developments — not just those with 10 or more units as required by the permit — to include at least source control BMPs. The *On-Site Manual* specifies that if a multi-family project’s gross area is less than one acre, or its runoff is treated in a regional facility (e.g., detention basin), source control BMPs are required for the project. If no regional treatment is provided and the project’s gross area is one acre or more, than an effective combination of source and treatment controls is required. The *On-Site Manual* includes three source control fact sheets in Section 3 applicable to multi-family residential projects: 1) storm drain inlet marking, 2) waste handling, and 3) vehicle washing.

Commercial Developments (Permit Provision 19a.ii)

Stormwater Permit Provision 19a.ii identifies commercial projects with 100,000 square feet or more of impervious surface as requiring stormwater quality source and/or treatment control BMPs. Currently, the Permittees meet or exceed this threshold for requiring stormwater quality BMPs on commercial projects. The *On-Site Manual* specifies that if the project has less than one acre of impervious area (less roof tops) or the runoff is treated in a regional facility (e.g., detention basin), only source control BMPs are required for the project. However, the permitting agency can require additional on-site treatment if warranted. If no regional treatment is provided and the commercial project has one acre or greater of impervious surface (less roof tops), than an effective combination of source and treatment

controls is required. The *On-Site Manual* includes several source control fact sheets in Section 3 applicable to commercial projects.

There are two differences in the way that the *On-Site Manual* addresses commercial projects vs. the Stormwater Permit, as follows:

- Table 2–1 does not identify requirements for specific types of commercial and industrial land uses (e.g., automotive repair shops, retail gasoline outlets), as the Stormwater permit does.
- Table 2–1 in the *On-Site Manual* excludes rooftop runoff from the calculation of impervious area for commercial and industrial land uses. This was done assuming that rooftop runoff was not a significant source of pollutants.

Automotive Repair Shops (Permit Provision 19a.iii)

Stormwater Permit Provision 19a.iii defines automotive repair shops with 5,000 square feet or more impervious surface as a priority category warranting source and/or treatment control BMPs. The *On-Site Manual* doesn't specifically list auto repair shops, but such projects would be considered commercial projects, subject to the requirements described above. The *On-Site Manual* includes three source control fact sheets in Section 3 applicable to activities which might take place at an auto repair shop: 1) storm drain inlet marking, 2) vehicle and equipment fueling, and 3) vehicle and equipment maintenance, repair and washing.

Restaurants (Permit Provision 19a.iv)

Permit Provision 19a.iv defines restaurants with 5,000 square feet or more impervious surface as a category warranting source and/or treatment control BMPs. The *On-Site Manual* doesn't specifically list restaurants, but such projects would be considered commercial projects, subject to the requirements described earlier for such projects. The *On-Site Manual* includes three source control fact sheets in Section 3 applicable to activities typically taking place at a restaurant: 1) storm drain inlet marking, 2) outdoor loading/unloading, and 3) waste handling.

Hillside Developments (Permit Provision 19a.v)

Developments with 5,000 square feet or more of impervious surface that are located in erosion prone areas with slopes 25 percent or greater are considered a category warranting source and/or treatment control BMPs. The City of Folsom is the only permittee affected by this requirement and has already complied with it through their Hillside Development Ordinance (Folsom City Code, Chapter 14.33). The ordinance applies to all projects, regardless of size and impervious area, in a designated (mapped) part of the community determined to have steep slopes and high erosion potential. This includes all areas of the city with slopes 25 percent or greater.

Parking Lots (Permit Provision 19a.vi)

Permit Provision 19a.vi defines parking lots that are exposed to rainfall of 5,000 square feet or more, or 25 or more parking spaces, as a category subject to source and/or treatment control BMPs. The *On-Site Manual* doesn't have a separate category for parking lots. Parking lots that are associated with multi-family residential, commercial and industrial projects would include stormwater quality source and/or treatment control BMPs as required for the respective land use type, as explained above. Following these requirements, all parking lots would at least include source control BMPs, such as “No Dumping—Drains to Creek/River” message stamped on new drain inlets. However, on-site treatment control BMPs (e.g., vegetated swales) would not typically be required unless the multi-family residential project is one acre or more in total size, or the commercial/industrial project has one or more acres of impervious surfaces, minus roof tops. The *On-Site Manual* does not address stand-alone parking lots that are not associated with residential, commercial or industrial buildings/projects.

Streets, Roads, Highways and Freeways (Permit Provision 19a.vii)

Permit Provision 19a.vii defines streets, roads, highways and freeways with paved surfaces five acres or greater (hereinafter “roads”) as another priority project category subject to source and/or treatment control BMPs. The Permittees do not have jurisdiction over freeways; these transportation corridors are addressed by Caltrans’

NPDES stormwater permit. The Permittees are partially addressing this category with respect to roads over which they have jurisdiction. Runoff from roads that are part of new residential and commercial subdivisions is typically treated in a regional facility such as a water quality detention basin, but other road runoff is probably not being treated. There are currently no requirements for treating runoff from transportation redevelopment projects (e.g., road widening).

Retail Gasoline Outlets (RGOs) (Permit Provision 19a.viii, 19b)

RGOs with an impervious area of 5,000 square feet or more are the final priority project category subject to stormwater BMPs (Provisions 19a.viii). Permit provision 19b specifies that at a minimum, RGOs must be required to use the BMPs listed in the *BMP Guide for Retail Gasoline Outlets*, published by the California Stormwater Quality Task Force (now known as the California Association of Stormwater Quality Agencies) in March 1997.

The *On-Site Manual* does not specifically list RGOs, but an RGO would be considered a commercial project and the requirements noted above for commercial development would apply. The *On-Site Manual* includes two source control fact sheets in Section 3 applicable to activities typically taking place at RGOs: 1) vehicle and equipment fueling, and 2) vehicle and equipment maintenance, repair and washing. The fueling fact sheet incorporates the BMPs included in the *BMP Guide for Retail Gasoline Outlets*, referenced earlier.

BMP Requirements (Provision 19b/e)

Stormwater Permit Requirements

Stormwater Permit Provision 19b requires the DSP to include a list of recommended source and/or structural treatment control BMPs for all new development and significant redevelopment projects falling under the above priority project categories. At a minimum, RGOs are required to use the BMPs listed in the California Storm Water Quality Task Force, March 1997 *BMP Guide for Retail Gasoline Outlets*.

A related Permit Provision (19e) requires the DSP to consider pollutants of concern or activities of

concern in identifying appropriate BMPs for new development or significant redevelopment projects. In selecting BMPs, the following need to be considered: (1) the target pollutants; (2) land use and pollutants associated with that land use type; (3) pollutants expected to be present on site at concentrations that would pose potential water quality concerns; and (4) changes in flow rates and volumes resulting from the development project and sensitivity of receiving waters to changes in flow rates and volumes.

Existing BMP Requirements

Since the mid 1990s, the Permittees have conditioned various projects to include stormwater quality source and treatment control BMPs. Stormwater treatment control BMPs include regional facilities such as detention basins and on-site BMPs such as vegetated swales. Developers in most newly developing areas have been required to construct regional water quality detention basins to capture and treat the runoff from drainage areas ranging from about 20 to 600 acres in size.

On-site treatment control BMPs are required for certain developments per Table 2–1 of the *On-Site Manual* and as discussed previously in this chapter in the section on Priority Development Project Categories. Section 4 of the *On-Site Manual* outlines criteria for selection, design, installation and maintenance of the following structural stormwater quality treatment BMPs:

- Vegetated swale and filter strip
- Sand filter (3 types)
- Infiltration basin and trench
- Porous paving blocks

In addition, certain proprietary stormwater quality BMPs have been installed in a limited fashion in various parts of the county since the mid 1990's. Several years ago, with increasing pressure from manufacturers to allow more widespread use of proprietary devices in Sacramento, the Permittees initiated a multi-year investigative study to determine if field data were available to justify pollutant removal performance claims. The results of the initial study were presented in the report entitled *Investigation of Structural Control Measures for New Development, November 1999*.

At the time of publication of the *On-Site Manual* in January 2000, none of the proprietary devices studied had met the study performance criteria protocol for acceptance in Sacramento. However, the City and County of Sacramento did include general information for proprietary BMPs in Section 4 of the *On-Site Manual*. The manual states: “*Alternative technologies that provide equivalent treatment are encouraged but may result in additional time for agency review and approval unless coordinated in advance with the [agency’s] stormwater staff*”. In addition, a general fact sheet is provided for “Alternative and Proprietary Control Measures” in the *On-Site Manual*.

The results of the ongoing investigation study to date have shown that only one proprietary device conforms to the performance criteria protocol established by the Permittees in the November 1999 report. Therefore, the Permittees are allowing proprietary devices that have not been approved only for small drainage areas/sites where it is infeasible to install another type of treatment control BMP described in the *On-Site Manual*. Additionally, the Permittees require or recommend one or more of the following conditions for new proprietary devices:

- Regular maintenance should be performed to help ensure pollutant removal effectiveness.
- A maintenance agreement must be signed by the property owner and recorded with the deed for the property.
- Monitoring must be conducted by the manufacturer and/or the property owner to demonstrate effectiveness after installation.

Some Permittees are more stringent with these requirements than others. The goal is to add proprietary BMPs to the *On-Site Manual* as they are approved.

Table 5–1 shows the estimated number of various types of stormwater treatment BMPs constructed in the county through November 2003. The table does not include facilities that have been approved but not yet constructed.

The Permittees have been requiring source control BMPs for development projects for several years. Guidance for source control BMPs is provided through a series of fact sheets in Section 3 of the *On-Site Manual*; these fact sheets already incorporate the RGO BMPs from the 1997 BMP Guide as required by the Stormwater Permit. Table 5–2 summarizes how various land uses are addressed by the fact sheets.

Table 5–1. Inventory of Existing Stormwater Quality Treatment BMPs in Sacramento County

BMP Type	Sac County and Rancho Cordova*	Sac City	Citrus Heights	Elk Grove**	Folsom	Galt	Total
Regional BMPs							
Dry Extended Detention WQ Basin	2	14	0	10	5	1	32
Wet Detention Water Quality Basin	4	10	1	1	31	2	49
Multi Functional Drainage Channel	1	0	0	1	0	0	2
On-Site BMPs							
Vegetated Swale	1	62	0	6	5	1	75
Vegetated Filter Strip	0	0	0	0	0	0	0
Sand Filter	1	2	0	0	0	0	3
Infiltration Trench	0	0	0	0	0	0	0
Infiltration Basin	0	0	0	0	0	0	0
Porous Paving Blocks	0	2	0	0	0	1	3
Other Pervious Pavement	5	0	0	0	0	0	5
Water Quality Detention Basin	0	2	0	0	7	0	9
Proprietary On-Site BMPs***							
Wet Vault	0	15	4	26	32	7	84
Swirl Concentrator	2	0	0	1	2	0	5
Deflection Screen	0	2	0	11	0	0	13
Media Filter	2	0	0	2	0	0	4
Drain Filter Insert	2	8	0	0	22	0	32
Combined System	0	0	0	0	0	0	0

Note: In some cases, numbers given are approximate. Numbers given are number of projects/sites (not number of BMPs) with existing, installed BMPs as of November 2003.

**The numbers are combined for the two agencies since the County provides stormwater/drainage services to Rancho Cordova.*

***Many of the BMPs were constructed (or projects were conditioned) by the County prior to Elk Grove incorporation in 2000.*

****The categories shown match those in the report entitled: Investigation of Structural Control Measures for New Development, November 1999.*

Table 5–2. Source Control BMPs Utilized in Sacramento County

Project Type/Activity	Source Control BMPs*										
	Paving—Impervious	Paving—Compatible w/ Materials Handled	Covers, Roofs & Enclosures	Grading/Berms—Run-on Prevention	Grading—Stormwater & Spill Containment	Sanitary Sewer Discharge	Emergency Storm Drain Seal	Overflow Protection	Educational Signs	Covered/Sealed Trash Receptacles	Storm Drain Message
Commercial/Industrial											✓
Material Storage	✓	✓	✓	✓	✓						
Outdoor Material Loading/Unloading	✓	✓	✓	✓	✓		✓				
Vehicle & Equipment Fueling	✓	✓	✓	✓	✓	✓	✓				
Vehicle & Equipment Maint, Repair, & Washing	✓	✓	✓	✓	✓	✓	✓				
Outdoor Process Equipment Operations & Maintenance	✓			✓	✓	✓	✓	✓			
Waste Handling	✓		✓	✓	✓	✓			✓		
Multi-Family Residential											✓
Vehicle Wash Areas	✓		✓	✓	✓	✓			✓	✓	
Waste Handling Areas	✓		✓	✓	✓				✓	✓	
Single Family Residential											✓

*Fact sheets for these source control BMPs (control measures) are included in Section 3 of the Guidance Manual for On-Site Stormwater Quality Control Measures, published in January 2000.

Comparison of Existing BMP Requirements with Stormwater Permit Requirements

The Permittees generally satisfy Stormwater Permit Provision 19b, as described above. They already require source and/or treatment control BMPs for the priority development project categories with the exception of parking lots and some road improvement projects. Stormwater Permit Provision 19e, which requires the DSP to consider pollutants of concern or activities of concern in identifying appropriate BMPs for new development or significant redevelopment projects, is also addressed, but needs clarification.

The source and treatment control BMPs included in the manual were selected based on consideration of pollutants, land uses and activities of concerns. Also, Section 4 of the *On-Site Manual* includes general information about pollutants addressed by each type of treatment control BMP. However, the manual does not explicitly associate land uses and activities of concern with the pollutants of concern for each BMP. For this reason, the Permittees prepared a conceptual BMP matrix to fully address Permit Provisions 19b and e; this matrix is presented in Chapter 6. The intent is to include a matrix similar to this in the updated *On-Site Manual*, as discussed later in Chapter 6.

Numeric Sizing Criteria for Stormwater Treatment BMPs (Provisions 19c/d)

Stormwater Permit Requirements

Stormwater Permit Provision 19c requires the Permittees to review their existing design standards for stormwater quality treatment control BMPs and determine if they are comparable to the following sizing criteria:

- i. Volume-based BMPs shall be designed to mitigate (infiltrate or treat) either:
 - a) The volume of runoff produced from a 24-hour 85th percentile storm event, as determined from the local historical rainfall record; *or*
 - b) The volume of runoff produced by the 85th percentile 24-hour rainfall event, determined as the maximized capture storm water volume for the area, from the

formula recommended in Urban Runoff Quality Management, Water Environment Federation (WEF) Manual of Practice No. 23/American Society of Engineers (ASCE) Manual of Practice No. 87, (1998); *or*

- c) The volume of annual runoff based on unit basin storage volume, to achieve 80 percent or more volume treatment by the method recommended in California Storm Water Best Management Practices Handbook — Industrial/Commercial, (1993). Note that this handbook was replaced in Spring 2003 by a new handbook published by the California Association of Stormwater Quality Agencies (CASQA).
- ii. Flow-based BMPs shall be designed to mitigate (infiltrate or treat) either:
 - a) The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two; *or*
 - b) The maximum flow rate of runoff, as determined from local historical rainfall records, that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.

Additionally, Provision 19d allows the Permittees to propose alternative equivalent design criteria to that specified in the permit.

Existing Design Criteria Used by the Permittees

The Permittees currently require engineers and designers to use one of three different methods to design stormwater quality treatment control BMPs. Regional water quality detention basins are designed with the Sato Method (volume-based criteria). On-site stormwater quality treatment control BMPs are designed using either the volume-based or flow-based criteria, depending on type of BMP, as published in the *On-Site Manual*. Additionally, the City of Folsom has published supplementary design criteria for sizing

certain proprietary on-site BMPs. These methods are discussed below.

Existing Design Criteria for Regional Water Quality Detention Basins

Since the mid 1990's the City and County of Sacramento have been using a method for sizing stormwater quality detention basins originally documented in the *Optimization of Stormwater Quality Enhancement by Detention Basins for the Sacramento Metropolitan Area* (J.F. Sato and Associates 1991). Commonly referred to as the "Sato Method," it is based on an analysis of long-term precipitation records that approximates a continuous simulation model. Sato Method design curves were produced to allow an engineer to size a basin based on the amount of impervious area for the project.

The Sato Method criteria is described in several documents, including *Volume 2: Hydrology Standards of the City and County of Sacramento Drainage Manual (Hydrology Standards)* and the *City of Sacramento Utilities Procedures Manual* (Section 11). The design criteria has been used to design and construct numerous detention basins in the areas served by the City and County of Sacramento as well as those areas now served by the new cities of Elk Grove and Rancho Cordova. The City of Galt also uses the County's design criteria. The City of Folsom uses several design sources including the County's design criteria, the Spring 2003 CASQA Handbook, and additional criteria outlined in Section 10.17 (Water Quality Design) of the City of Folsom *Design and Procedure Manual and Improvement Standards*.

Existing Design Criteria for On-Site Stormwater Quality Treatment BMPs

The *On-Site Manual* includes numeric sizing criteria for various types of on-site treatment BMPs. Vegetated swales and filter strips are sized on the basis of water quality flow, which is defined as the peak flow of runoff from the two-year/six hour event using intensity-depth-frequency (IDF) curves published by the individual Permittees. The City and County of Sacramento IDF curves are included in the Volume 2 Hydrology Standards and the City of Folsom has produced its own unique curves, published in its *Design and Procedure Manual and Improvement Standards*. Other on-site

stormwater treatment facilities (e.g., infiltration, sand filters) in the *On-Site Manual* are sized on the basis of water quality volume, defined as the first one-half inch of runoff from the contributing area connected to the treatment control BMP.

Folsom Design Criteria for Proprietary BMPs

In addition to using the *On-Site Manual*, Folsom has published design criteria for a proprietary device. In the City's *Design and Procedure Manual and Improvement Standards*, Section 10.17 (Water Quality Design) includes this criteria for pre-manufactured storm drain interceptors: "...interceptors shall conform to the City's Standard Drawing SD-42 for flows up to 3 cfs. For larger flows, the interceptor vault and plates/baffles shall be sized to accommodate capacity. All designs and calculations shall be reviewed and approved by the City. Unless approved by the City, multiple interceptors in series or parallel shall not be used."

Comparison of Existing Design Criteria to Stormwater Permit Criteria

The Permittees hired an experienced consultant team to conduct the studies and engineering analyses required to determine whether or not the existing numeric sizing criteria used in the Sacramento area are comparable to those in the Stormwater Permit. The results of this work are documented in Appendix F and briefly summarized in this section.

Design Criteria for Regional Water Quality Detention Basins

The Consultants' findings show that the Sato Method currently used by the Permittees to design and size regional water quality detention basins complies with the WEF/ASCE method specified in Permit Provision 19c.i.b and the CASQA Handbook method specified in Provision 19c.i.c.

Design Criteria for On-Site BMPs (Volume-Based Criteria)

The consultants' findings show that the *On-Site Manual's* volume-based criteria used to design and size certain on-site stormwater quality treatment BMPs complies with the WEF/ASCE method (Provision 19c.i.b) and the CASQA Handbook method (Provision 19c.i.c) for some

land-use conditions, but not all. During the update of the *On-Site Manual*, an updated design methodology would need to be utilized to completely satisfy the Stormwater Permit requirements.

Design Criteria for On-Site BMPs (Flow-Based Criteria)

The consultants' findings show that the *On-Site Manual's* flow-based criteria used to design and size certain on-site stormwater quality treatment BMPs complies with the flow-based 85th percentile method specified in Permit Provision 19c.ii.a. The method currently used is also consistent with the method recommended in the Spring 2003 CASQA Handbook.

Infiltration and Groundwater Protection (Provisions 19g)

Stormwater Permit Requirement

The Stormwater Permit (Provision 19g) requires the Permittees to apply restrictions to the use of infiltration BMPs to protect groundwater quality. The restrictions need to ensure that the use of infiltration BMPs will not cause a violation of applicable groundwater quality standards.

Existing Infiltration and Groundwater Protection Restrictions

Infiltration BMPs are not commonly used in the Sacramento area, due to the prevalence of poor-draining clay soils. Also, infiltration facilities have a history of requiring more frequent maintenance to prevent clogging than other BMPs. These factors typically dissuade most local engineers from incorporating infiltration into their site designs. The *On-Site Manual* does allow the use of three types of infiltration BMPs: basins, trenches and paving blocks. The sections describing these techniques caution that the use of the devices could cause groundwater contamination. The following limitations are also noted:

- Cannot be used in areas with high ground water levels
- Cannot be used in high risk areas such as service/gas stations, truck stops, loading racks or heavy industrial areas (due to potential for pollutants to enter groundwater)

- Cannot be located in areas with groundwater quality concerns

In addition to the *On-Site Manual* restrictions, the Permittees implement and enforce various codes and policies related to protection of groundwater quality, as summarized in Appendix D.

Comparison of Existing Infiltration Restrictions with Stormwater Permit Requirements

The Permittees already restrict the use of infiltration BMPs to protect groundwater quality as required by Permit Provision 19g. However, the *On-Site Manual* does not restrict the use of unlined stormwater filters, such as vegetated swales. While these are not primarily infiltration devices, they do allow infiltration and therefore have the potential to impact groundwater quality.

Downstream Erosion (Provision 19h)

Stormwater Permit Requirement

Provision 19h of the Stormwater Permit requires the DSP to include any existing criteria or proposed modifications that are needed to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. The Permittees are required to consider the need for measures to control peak stormwater discharge rates, velocities, volumes and durations.

Existing Measures to Prevent Downstream Erosion

When preparing drainage master plans, the Permittees use computer models to predict future runoff flows and velocities as a result of new development and establish requirements for detention basins and other infrastructure that will mitigate the expected increases. Developers are also required to estimate future flows and velocities and mitigate increases when planning drainage improvements for a new development project. These calculations are subject to review by the agency with jurisdiction. In addition, the Permittees currently implement and enforce various codes and policies related to prevention of downstream erosion, as summarized in Appendix D.

Comparison of Existing Measures to Prevent Downstream Erosion with Stormwater Permit Requirements

The Permittees address the Stormwater Permit requirements of Provision 19h to some degree, with the City of Folsom having the most comprehensive code language to address peak discharge rates, velocities, volumes and durations. In order to help determine if the existing standards documented in Appendix D are “protective of downstream creek stability and habitat” as required by the Permit, the Permittees will initiate an erosion potential study in 2004. It is anticipated that the study will recommend strengthening the Permittees’ codes if necessary to protect downstream resources from erosion. This is discussed further in Chapter 6.

Maintenance Agreement and Transfer (Provision 10g and 22)

Stormwater Permit Requirements

Regional Water Quality Detention Basins

Stormwater Permit Provision 10g requires the Permittees to prepare and implement guidelines for operating and maintaining detention basins within their respective jurisdictions. These guidelines shall consider, at a minimum, the following: (1) inspection frequency; (2) maintenance frequency for removal of accumulated sediment, trash and debris; and (3) maintenance and stabilization of basin side slopes to prevent erosion and incorporation of additional sediment into outflow.

On-Site Stormwater Quality Treatment BMPs

Stormwater Permit Provision 22 specifies that each permittee shall require verification of maintenance provisions for structural and treatment control BMPs required of new and redevelopment projects. Verification shall include one or more of the following as applicable:

- a) The developer's signed statement accepting responsibility for maintenance until the maintenance responsibility is legally transferred to another party; or
- b) Written conditions in the sales or lease agreement that require the recipient to assume responsibility for maintenance; or

- c) Written text in project conditions, covenants and restrictions for residential properties assigning maintenance responsibilities to a home owner’s association, or other appropriate group, for maintenance of structural and treatment control BMPs; or
- d) Any other legally enforceable agreement that assigns responsibility for maintenance of structural or treatment control BMPs.

Existing Requirements for BMP Maintenance

Currently, maintenance programs and requirements vary among the Permittees and also vary depending on the type of BMP, as described below. All the Permittees have inventories of the BMPs in their jurisdictions, as shown on Table 5–1. Such inventories are critical for developing and overseeing effective maintenance programs.

Regional Water Quality Detention Basins

Following their construction and acceptance by the municipality, regional water quality detention basins within the public right of way become the responsibility of the municipality. They are typically operated and maintained according to schedules established for the stormwater drainage system as a whole. Some Permittees have written maintenance guidelines for regional detention basins, and others conduct maintenance more informally.

For the past six years, the County has been studying sediment accumulation and maintenance needs associated with seven basins in the southern part of the County (some areas now served by Elk Grove). The intent of the study is to track the accumulation of certain pollutants in basin sediments and based on that, recommend sediment cleanout frequencies so that materials can be safely disposed of in a local municipal landfill. As required by the Stormwater Permit (Provision MRP III.A), this study will continue through 2004 and a final report will be developed thereafter. All of the Permittees will use the report findings to determine if changes are needed to their individual maintenance programs.

On-Site Stormwater Quality Treatment Control BMPs

The *On-Site Manual* describes the long-term operation and maintenance needs of the on-site

stormwater BMPs presented in the document. That information helps the property owner and his/her engineer or designer select the most appropriate BMPs for a project. The County and cities of Elk Grove and Sacramento currently require maintenance agreements for the following types of on-site BMPs constructed in multi-family residential, commercial, or industrial areas: infiltration BMPs, sand filters, and all types of proprietary BMPs (see list in Table 5–1).

The maintenance agreement is signed by the property owner or his/her designee (e.g., property manager) and recorded with the deed for the property, so that the maintenance requirements remain in effect even if the property changes ownership. The other Permittees (Citrus Heights, Folsom and Galt) do not currently require agreements for these types of on-site stormwater BMPs.

The cities of Sacramento and Folsom have permitted the construction of a few on-site water quality detention basins and those are maintained by the property owner, homeowners' associations or special districts, such as a lighting and landscaping district.

Agreements are not currently required for vegetated BMPs since these aboveground facilities are typically part of a site's landscaping and are maintained routinely for aesthetic and drainage purposes.

Comparison of Existing Maintenance Requirements with Stormwater Permit Requirements

Regional Water Quality Detention Basins

Some, but not all, of the Permittees have written detention basin maintenance plans and/or guidelines for field maintenance crews. The City of Sacramento has developed maintenance plans for its basins in the North Natomas area. The County has developed an inspection/maintenance checklist for its basins. For those Permittees without a formal inspection plan/schedule for the basins, the facilities are inspected by crews conducting work on upstream or downstream portions of the stormwater drainage system on an as-needed basis. The Permittees are waiting for the results of the County's detention basins sediment study (2004–5) to determine the optimum schedules for cleaning out and disposing

of accumulated sediments. Field crews may conduct tasks to maintain and stabilize basin side slopes to prevent erosion, but this is currently done on an as-needed basis in problem areas as warranted by visual observations, rather than as a routine maintenance task.

On-Site Stormwater Quality Treatment Control BMPs

Some of the Permittees partially meet the Stormwater Permit Provision requiring maintenance for on-site BMPs. For example, the requirements of the County and cities of Elk Grove and Sacramento satisfy Provision 22d for infiltration BMPs, sand filters, and proprietary BMPs, where maintenance agreements are recorded with the property deed. The City of Folsom is fulfilling the permit requirement (using the option in Provision 22c) with respect to on-site water quality detention basins in residential subdivisions that are maintained under agreement by the homeowners' association or a special district.

All the Permittees need to amend their existing maintenance programs to fully meet the Stormwater Permit requirements; the proposed amendments are discussed in Chapter 6.

CEQA Review Procedures (Permit Provision 23)

Stormwater Permit Requirements

Provision 23 of the Stormwater Permit requires each Permittee to incorporate into its CEQA process, within 180 days of the Permit's effectiveness date, procedures for considering potential storm water quality impacts and providing for appropriate mitigation when preparing and reviewing CEQA documents. The permit was effective January 25, 2003, making the deadline for this CEQA update task July 24, 2003.

Existing CEQA Review Procedures

Potential impacts to stormwater runoff and receiving water quality have long been a consideration by the Permittees during the CEQA review process. However, the Stormwater Permit goes a step farther in requiring the Permittees to consider additional, perhaps more specific, water quality protection principles outlined in Permit

Provision 23, such as 23c: “[Consider the] Potential for discharge of stormwater from material storage areas, vehicle or equipment fueling, vehicle or equipment maintenance, ...or other outdoor work areas”.

To address this requirement, the Permittees worked with their planning and environmental review staff during summer 2003 to amend their CEQA review procedures and Initial Study checklists. Some of the agencies also amended standard conditional language used by the planners to prepare environmental impact reports (EIRs) and other environmental documents. Copies of these materials were, or will be provided, in the individual Permittee Annual Reports.

General Plan (Permit Provision 24)

Stormwater Permit Requirements

Provision 24 of the Stormwater Permit requires each Permittee to evaluate and amend, revise, or update as necessary, its General Plan to include watershed and storm water quality and quantity management considerations and policies when any of the following General Plan elements are updated or amended: land use, housing, conservation, and open space. Additionally, Permittees are required to provide the Regional Board with the draft amendment or revision when a listed General Plan element or the General Plan is noticed for comment in accordance with California Government Code § 65350 *et seq.*

Status of General Plan Updates for Permittees

The cities of Citrus Heights, Elk Grove and Rancho Cordova adopted the County’s General Plan upon incorporation. The cities of Sacramento, Folsom and Galt have their own unique General Plans. All of the existing General Plans include language addressing water quality and receiving water protection in the Conservation Element.

The City of Elk Grove recently adopted a new General Plan on November 19, 2003. During that process, steps were taken to incorporate water quality principles and concepts specified in this Stormwater Permit. The other five permittees have recently begun, or are about to embark, on the process to update their General Plans. This work is described in Chapter 7.

Technical Guidance and Information for Developers (Permit Provision 26)

Stormwater Permit Requirement

Permit Provision 26b requires that within one year of adopting development standards, each Permittee shall issue new or amended technical guidance manuals to the development community in that Permittee’s jurisdiction for the siting and design of storm water quality BMPs. The technical manual(s) shall at a minimum include:

- i. Source and treatment control BMP design criteria for BMPs acceptable for use in the local area;
- ii. Peak flow control criteria to control peak discharge rates, velocities and duration;
- iii. Expected pollutant removal performance ranges for the BMPs (or references to national databases, technical reports and/or scientific literature); and
- iv. Maintenance considerations.

Existing Technical Guidance Manual

The City and County of Sacramento published the *On-Site Manual* in January 2000 as technical guidance for the development community. The manual is also used by the other Permittees. It is made widely available in electronic form through the City and County of Sacramento’s web sites and a hard copy can be purchased from the City in person or through the mail.

Comparison of Existing *On-Site Manual* to Stormwater Permit Requirements

The existing *On-Site Manual* satisfies Permit Provisions 26.b.i and iv, related to source/treatment control BMP design criteria and maintenance considerations, respectively. It does not currently address peak flow criteria or expected pollutant removal performance ranges for BMPs. Also, it does not include design criteria for regional water quality detention basins; this criteria is currently contained in separate documents. These issues will be addressed with the proposed update of the *On-Site Manual* discussed in the next chapter. Since the updated manual will contain the amended development standards required by the Stormwater Permit, the document is proposed for completion within one year of approval of the DSP by the Regional Board.

Chapter 6

Proposed Amendments to Key Development Standards

Provision 17c of the Stormwater Permit requires that the DSP include “a description of the proposed modifications to the Development Standards to ensure that, at a minimum, they are consistent with the requirements of State Board Order WQ 2000-11 and this Order (the Stormwater Permit)”. As stated previously, the applicable requirements of WQ 2000-11 were incorporated into the Sacramento Stormwater Permit adopted by the Regional Board in December 2002. Therefore, addressing the permit requirements also satisfies WQ 2000-11.

This chapter outlines proposed amendments to the Permittees’ key development standards needed to comply with the Stormwater Permit, based on the comparisons to the permit requirements made in Chapter 5. The recommendations are subject to change based on comments received during the Regional Board’s public review process, which is anticipated to take place in 2004.

Chapter 7 proposes additional amendments to other development standards to protect water quality which were not specifically required for inclusion in the DSP, but are included in this document for completeness.

Proposed Amendments Applicable to All Permittees

Update On-Site Manual (Create New Countywide Stormwater Procedures and Design Manual)

The Permittees plan to update the existing *City and County of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures* (the *On-Site Manual*) and are considering renaming it the *Sacramento Stormwater Management Program Procedures and Design Manual for Stormwater Quality BMPs* (*Stormwater Design Manual*) or something similar. The *Stormwater Design Manual* will

apply throughout the county to promote consistency among the stormwater requirements of the various Permittees. It will serve as the main tool for ensuring that projects in the eight priority development project categories specified in the Stormwater Permit are required to include stormwater quality controls.

The Permittees plan to work together to create the updated document. A steering committee will likely be formed to guide this and future updates, and a development advisory committee may also be formed. Model manuals from other communities such as Atlanta, Georgia; Portland, Oregon; and Ventura, California will be reviewed for presentation and content ideas, and cross references will be made to the new 2003 California BMP Handbook for Development published by CASQA. The target date for completing the *Stormwater Design Manual* is one year following adoption of the DSP by the Regional Board. This schedule is discussed more in Chapter 8.

The following is a preliminary list of proposed changes to the *On-Site Manual*:

- Change name to *Sacramento Stormwater Management Program Procedures and Design Manual for Stormwater Quality BMPs* or something similar
- Include contact information for all the Permittees
- Incorporate relevant standards and design criteria for regional detention basins so that all stormwater quality design information applicable to the post-construction phase of development and redevelopment projects is in a single document
- Update the numeric sizing criteria as recommended in Chapter 6 and Appendix F

- Include a definition for “significant redevelopment” consistent with the Stormwater Permit
- Include a BMP decision matrix to guide agency and private sector designers in the selection of appropriate BMPs for the land use and pollutants of concern applicable to the project

Table 6–1 (presented later in this chapter) presents a conceptual matrix that is currently being considered by the Permittees; it is subject to revision until the manual is complete. This matrix (or some version of it) will likely replace Table 2–1 in the existing manual to clarify how the BMP requirements apply to the eight priority project categories listed in Stormwater Permit Provision 19a (see more details in the next section).

- Add recommendations related to general site design principles such as promoting watershed-based planning concepts; protecting natural areas, slopes and channels; controlling peak runoff rates; and minimizing impervious area
- For clarity, add groundwater protection language to the information presented for vegetated swales and any other BMPs found to have the potential to introduce pollutants to groundwater

Proposed Amendments to Address Priority Project Categories

This section describes proposed amendments to the *On-Site Manual* (which will be renamed, as noted above) to address the priority development project categories listed in Provision 19a of the Stormwater Permit.

Residential Subdivisions: Single Family Residential (Permit Provision 19a.i)

The Permittees plan to continue to distinguish between single family residential and multi-family residential projects and set unique requirements for each, even though the Stormwater Permit does not require this. Pollution prevention and BMP strategies for the two types of land uses can be very different.

The Permittees are considering amending the *On-Site Manual* to lower the threshold for requiring treatment control BMPs for single family subdivisions. Some Permittees already do this in practice. Treatment control BMPs may be required of all mid-size subdivisions (20-25 acres) — not just all those over 100 acres, as is currently the case.

The Permittees would like to continue to base the requirement for treatment control BMPs on the gross acres of a single family subdivision, rather than the number of units (10), which is the threshold used by the Permit to define priority residential projects subject to source and/or treatment control BMPs. In Sacramento, gross size is probably a better threshold than the number of lots, due to the variations in lot sizes, particularly with rural agricultural land uses (single family residential lots of 1, 2 and 5 acres each) in the eastern part of the county.

Residential Subdivisions: Multi Family Residential (Permit Provision 19a.i)

No changes are needed to the *On-Site Manual* to bring the current requirements into conformance with the Stormwater Permit. However, the Permittees plan to consider changing the threshold for when multi-family residential projects need treatment control BMPs from one acre of gross area, to ten units. This would make the treatment BMP trigger identical to the threshold used in the Stormwater Permit to define priority residential projects subject to source and/or treatment control BMPs. All projects would continue to require source control BMPs at a minimum, using the applicable source control fact sheets in the *On-Site Manual*.

Commercial Developments (Permit Provision 19a.ii)

The Permittees propose to amend Table 2–1 in the *On-Site Manual* to include rooftop runoff in the calculation of impervious area for the purposes of determining whether or not a site is required to include stormwater treatment BMPs. No additional amendments are proposed, since the existing development standards exceed the Stormwater Permit requirements for this land use category.

Automotive Repair Shops (Permit Provision 19a.iii)

The Permittees will add a separate category for auto repair shops to the *On-Site Manual* rather than continue to address them in the same way as all commercial projects. The Permittees plan to keep the current threshold for automatically requiring treatment control BMPs for automotive repair shops with one acre or more of impervious area, but will begin including roof top area in the calculation of impervious area.

The BMP matrix (Table 6–1) that is proposed to be added to the *On-Site Manual* will prohibit the use of selected infiltration and filtration BMPs at automotive repair shop sites, due to the potential for hydrocarbons and other pollutants to migrate to groundwater.

Also, the Permittees will consider whether it would be beneficial to create new source control fact sheets for additional activities that have the potential to pollute runoff. It should be noted that the Permittees' industrial inspection programs control and issue enforcement actions related to pollutant generating activities (e.g. power washing pavement and allowing polluted runoff to enter storm drain inlets) at auto repair shops. Based on experience, the Permittees believe that focusing on the daily operational aspects of these facilities and promoting education will do more for protection of water quality than new development requirements.

Restaurants (Permit Provision 19a.iv)

The Permittees will add a separate category for restaurants to the *On-Site Manual* rather than continue to address them in the same way as all commercial projects. The Permittees plan to keep the current threshold for automatically requiring treatment control BMPs for restaurants with one acre or more of impervious area, but will begin including roof top area in the calculation of impervious area.

They will consider making a stronger requirement for connecting trash enclosure drains to a dead end sump or the sanitary sewer system. Currently this is only a recommendation in the source control fact sheet for waste handling. Finally, the Permittees will consider whether it would be beneficial to create new source control fact sheets for additional activities that have the potential to

pollute runoff. It should be noted that the Permittees' industrial inspection programs control and issue enforcement actions related to pollutant generating activities at restaurants. As with auto repair shops, the Permittees believe that focusing on the daily operational aspects of restaurants and promoting education will do more for protection of water quality than new development requirements.

Hillside Developments (Permit Provision 19a.v)

This requirement is adequately addressed by the City of Folsom and does not apply to the other Permittees. Additionally, the proposed BMP matrix (Table 6–1) prohibits/limits the use of certain BMPs in areas with a slope greater than 25%.

Parking Lots (Permit Provision 19a.vi)

The Permittees will consider the following changes to the *On-Site Manual*:

- Clarify that parking lots associated with buildings and facilities are covered by the requirement applicable to that land use category
- Include a new category in the Design Manual for parking lots exposed to rainfall that are not associated with a commercial, industrial or multi-family residential project and are 5,000 square feet or more in size, or contain 25 or more parking spaces

Streets, Roads and Highways (Permit Provision 19a.vii)

The Permittees propose to change the *On-Site Manual* to:

- Clarify that runoff from roads associated with new residential, commercial and industrial land uses should be treated per the requirements for the applicable land use.
- Add requirements for development of public road capital projects and redevelopment of existing roads (e.g., widening) that adds five or more acres of new impervious surface

Retail Gasoline Outlets (RGOs) (Permit Provisions 19a.viii., 19b)

The Permittees will add a separate category for RGO's to the *On-Site Manual* rather than continue to address them in the same way as all commercial projects. The Permittees plan to keep the *On-Site Manual* current threshold for requiring treatment control BMPs for RGOs with one acre or more of impervious area, but will begin including roof top area in the calculation of impervious area. The BMP matrix (Table 6–1) that is proposed to be added to the *On-Site Manual* will prohibit the use of selected infiltration and filtration BMPs at RGO sites, due to the potential for hydrocarbons and other pollutants to migrate to groundwater. The current *On-Site Manual* source control fact sheet for fueling operations specifies that the fueling area must be covered with a concrete pad and “may be required” to drain to a dead end sump or to the sanitary sewer. The Permittees plan to consider making this an automatic requirement rather than a recommendation.

The Permittees' industrial inspection programs are designed to control pollutant generating activities (e.g. power washing pavement and allowing polluted wash water to enter storm drain inlets) at RGOs. Based on experience, the Permittees believe that focusing on the daily operational aspects of RGOs (e.g., power washing) and promoting education about source controls has the potential of protecting water quality as much or more than new development structural BMP requirements alone.

Proposed Amendments Related to BMP Selection Criteria

The BMP selection matrix presented in Table 6–1 is being considered for inclusion into the updated *On-Site Manual* (which will be renamed the *Stormwater Design Manual*, as noted previously). The matrix is subject to revision until the final manual is published. Table 6–1 is intended to provide agency planners and engineers, as well as development and design professionals, with a user-friendly tool to help select the most appropriate BMPs for a development project given the land use and expected pollutants. The matrix includes consideration of the Sacramento target pollutants (which currently include diazinon, chlorpyrifos, lead, copper, mercury, and coliform/pathogens). This information will be updated as the target pollutant list evolves.

Information about various BMPs' relative effectiveness at removing pollutants may also be added to the manual and updated over time to reflect the evolving state of the practice and knowledge about BMPs.

Table 6–1. Conceptual BMP Selection Matrix for Priority Development Project Categories

Priority Development Project Category	Source Control BMPs							Treatment Control BMPs (select one)												
	Storm Drain Message and Signage	Outdoor Material Storage	Waste Handling	Outdoor Material Loading/unloading	Vehicle/Equipment Repair/maintenance/washing	Outdoor Process Equipment Operations and Maintenance	Vehicle and Equipment Fueling	Threshold	Vegetative Filter Strip	Vegetative Swale	Dry Extended Detention Basin	Wet Detention Basin	Constructed Wetland (a)	Media Filtration/Sand Filter (a)	Porous Pavement Detention	Porous Landscape Detention	Infiltration Basin	Infiltration Trench	Alternative and Proprietary Controls (b)	Proof of BMP Maintenance
Residential (Single Family)	✓	NA	NA	NA	NA	NA	NA	> 20 ac	•	•	•	•	•	•	•	•	•	•	•	•
Residential (Multi-Family)	✓	NA	✓	NA	✓	NA	NA	≥ 1 ac	•	•	•	•	•	•	•	•	•	•	•	•
Commercial Developments	✓	✓	✓	✓	✓	✓	✓	impervious area ≥ 1 ac	•	•	•	•	•	•	•	•	•	•	•	•
Automotive Repair Shops	✓	✓	✓	✓	✓	✓	✓	impervious area ≥ 1 ac	NA	NA	NA	NA	NA	•	NA	NA	NA	NA	•	•
Retail Gasoline Outlets	✓	✓	✓	NA	✓	NA	✓	impervious area ≥ 1 ac	NA	NA	NA	NA	NA	•	NA	NA	NA	NA	•	•
Restaurants	✓	✓	✓	✓	✓	NA	NA	impervious area ≥ 1 ac	•	•	•	•	•	•	•	•	•	•	•	•
Hillside Developments	✓	(c)	(c)	(c)	(c)	(c)	(c)	≥ 25% slope	NA	NA	•	•	•	•	NA	NA	NA	NA	•	•
Parking Lots (d)	✓	NA	NA	NA	NA	NA	NA	≥ 5,000 sf or 25 spaces	•	•	•	•	•	•	•	•	•	•	•	•
Street/Roads	✓	NA	NA	NA	NA	NA	NA	impervious area ≥ 5 ac	•	•	•	•	•	•	•	•	•	•	•	•
Industrial Development (e)	✓	✓	✓	✓	✓	✓	✓	impervious area ≥ 1 ac	•	• (f)	• (f)	• (f)	• (f)	•	• (f)	• (f)	• (f)	• (f)	• (f)	•

✓ = Required if applicable to project

• = Acceptable

(a) = Pretreatment highly recommended

(b) = Use only on a case-by-case basis with local agency approval or in combination with other applicable treatment control measures

(c) = Depends on type of land use (commercial, multi-family, residential, etc.)

(d) = Stand-alone parking lots only. Parking lots associated with buildings/facilities need to meet requirement of associated land use (commercial, industrial, etc.)

(e) = Facility will likely require coverage under State’s NPDES General Permit for Stormwater Discharges Associated with Industrial Activity

(f) = May be allowed to treat employee/customer vehicle parking lot runoff only

NA = Not Applicable or Not Allowable

Proposed Amendments Related to Numeric Sizing Criteria for Stormwater Quality Treatment Control BMPs

The technical consultants' findings documented in Appendix F and summarized in Chapter 5 show that the Permittees' existing methods for designing regional water quality detention basins and flow-based on-site stormwater quality treatment control BMPs are consistent with the design criteria specified in the Stormwater Permit. However, the volume-based criteria currently used to design certain on-site stormwater quality treatment BMPs does not comply with the Permit for certain land-use conditions. Therefore, changes will be made to the volume-based criteria in the *On-Site Manual* during the process to update the manual.

Alternatively, the Permittees may use the Spring 2003 CASQA Handbook methods for design of all types of stormwater BMPs, as recommended by the consultants. Details about that recommendation can be found in Appendix F.

Proposed Amendments Related to Infiltration and Groundwater Protection Requirements

The Permittees will consider amending the *On-Site Manual* so that restrictions designed to protect groundwater quality apply to filtration facilities that can allow infiltration, such as vegetated swales. The restrictions already apply to BMPs that are designed with infiltration as their primary function.

Proposed Amendments for Controlling Downstream Erosion and Protecting Stream Habitat

As explained in Chapter 5, the Permittees partially meet the Stormwater Permit requirements for controlling downstream erosion, with the City of Folsom having the most comprehensive code language to address peak discharge rates, velocities, volumes and durations. The other Permittees will review Folsom's language and consider improvements to their own codes as needed. The new *Stormwater Design Manual*

(which will replace the *On-Site Manual*) might also include design information for BMPs to ensure that discharges from the outlet of the BMP do not create downstream erosion problems.

In addition, the Permittees will initiate an erosion potential study in 2004 to comply with Stormwater Permit Provision MRP III. This work will help determine whether or not the existing standards are sufficiently protective of downstream creek stability and habitat. It is anticipated that the study will also provide additional recommendations for strengthening the Permittees' codes to protect downstream resources from erosion.

Proposed Amendments Related to Maintenance of Stormwater Quality Treatment BMPs

The Permittees are proposing several tasks to fully satisfy the Stormwater Permit requirements. They will work together to update the *On-Site Manual* to expand the information related to maintenance requirements for various types of BMPs. Additionally, each Permittee will update or develop maintenance requirements specific to its jurisdiction related to regional facilities (e.g., water quality detention basins) and on-site stormwater quality treatment BMPs, to satisfy Permit Provisions 22.

Proposed Amendments Applicable to Individual Permittees

This section describes proposed amendments to existing codes and standards that are needed by each Permittee in order to implement the new *Stormwater Design Manual* (the revised *On-Site Manual*) discussed in the preceding section. These amendments will satisfy the Stormwater Permit DSP requirements and provide the necessary legal authority to require the development community to comply with the requirements in the new manual. Unless stated otherwise, the proposed target date for making the noted amendments is one year following adoption of the DSP by the Regional Board; this is reflected in the schedule shown in Chapter 8.

Chapter 7 presents additional development standard amendments (e.g., General Plan updates, amendments to municipal and zoning codes, etc.) being considered by the Permittees to address water quality and watershed protection principles. Those additional amendments are generally on a longer timetable than those discussed in this chapter.

County of Sacramento and Cities of Citrus Heights, Elk Grove and Rancho Cordova

The following proposed amendments apply to the unincorporated County and the Cities of Citrus Heights, Elk Grove and Rancho Cordova, since these cities adopted the County’s Municipal Code and Improvement Standards upon incorporation.

Municipal Code (Sacramento County Code), Chapter 15.12 (Stormwater Ordinance)

Amend the Stormwater Discharge and Management Ordinance as follows:

- Add provision authorizing the Water Resources Director or their designee to establish requirements for new and significant redevelopment
- Define “significant redevelopment” to be consistent with the Stormwater Permit
- Reference the new *Stormwater Design Manual* (update of existing *On-Site Manual*; discussed previously in this chapter) and eliminate references to outdated design and guidance documents

Volume 2 of City/County Drainage Manual (Hydrology Standards)

Remove design information related to sizing water quality detention basins when the new *Stormwater Design Manual* (update of existing *On-Site Manual*) is published. Currently, changes to the Hydrology Standards need to be approved and adopted by the Board of Supervisors.

Improvement Standards

Reference the new *Stormwater Design Manual* and eliminate references to outdated design and guidance documents. Currently, changes to the Improvement Standards need to be approved and adopted by the Board of Supervisors.

City of Sacramento

Volume 2 of City/County Drainage Manual (Hydrology Standards)

Work with County to remove or revise design information related to sizing water quality detention basins. Permittees are considering incorporating regional water quality control criteria in the new *Stormwater Design Manual* (update of existing *On-Site Manual*).

City of Sacramento Utilities Procedure Manual

Remove and/or revise regional water quality design criteria when the new *Stormwater Design Manual* (update of existing *On-Site Manual*) is published.

Standard Conditions

Revise standard conditions to reflect proposed changes for BMP implementation and add maintenance requirements.

City of Folsom

Folsom Municipal Code

Amend Chapter 8.70 (Stormwater Discharge and Management Ordinance) to better address new development and significant redevelopment.

City of Folsom Design and Procedure Manual and Improvement Standards

Provide reference to new *Stormwater Design Manual* (update of existing *On-Site Manual*) and eliminate references to outdated design and guidance documents.

Standard Conditions

Consider amendments to the standard conditions to better address BMP implementation and maintenance requirements and reflect the new *Stormwater Design Manual*.

City of Galt

Galt Municipal Code

Amend Chapter 16.10 the (Stormwater Ordinance), Section 120 with the following language or similar: "...the City may require, in its discretion, new development or redevelopment projects to implement designs, which minimize stormwater runoff."

Improvement Standards

Reference the new *Stormwater Design Manual* (update of existing *On-Site Manual*) as part of the City's Improvement Standards.

Chapter 7

Proposed Amendments to Other Development Standards

Chapter 6 described proposed amendments to key development standards to comply with the Stormwater Permit requirements. This chapter describes additional proposed amendments that are being considered by the Permittees to address water quality and watershed protection. The proposed amendments were not specifically required for inclusion in the DSP and are subject to change until they are formally adopted or otherwise approved by the Permittees.

The amendments proposed in this chapter are based on the review and evaluation of existing development standards completed by each Permittee, as documented in Appendix D. It should be noted that Stormwater Permit Provision 16a states that in reviewing and updating its water quality and watershed protection principles and policies, the Permittees shall “consider” the principles outlined in Provision 16a.i – viii. All of the Permittees made these considerations, but are not required by the Permit to modify plans and policies to address each and every principle.

County of Sacramento and City of Rancho Cordova

The following proposed amendments apply to the unincorporated County and the City of Rancho Cordova, since the city adopted all of the County’s plans, codes and standards when it incorporated in July 2003. The city may elect to amend this portion of the DSP when they achieve permittee status.

General Plan

The County recently initiated a process to update its 1993 General Plan. During the process, which is expected to take two or more years, the County will consider the need to integrate the water quality and watershed protection principles outlined in the Stormwater Permit (Provision 16a). The current General Plan addresses the

principles to a degree through stormwater quality policies contained in CO –9, 10 and 12 of the Conservation Element, but updates will be considered. As required by the permit (Provision 24), the County will also review the Land Use, Housing and Open Space Elements for references to water quality protection goals, and identify any necessary updates. The County will work with the other Permittees embarking on General Plan updates and will consider example General Plan language used by other communities, as described in Appendix D.

Community and Specific Plans

The County will consider including appropriate water quality protection language in future community and specific plans and will consider example language used by other agencies in their community/specific plans, as described in Appendix D.

Design Guidelines for Commercial Development

The County is preparing design guidelines for commercial developments in the unincorporated areas and will integrate water quality protection principles as appropriate. The public review process is projected to begin in late 2003.

Zoning Code

The County will consider amendments to the following chapters and articles of Title III of the Zoning Code (Use Regulations and Development Standards) to integrate water quality concepts and eliminate potential conflicts with stormwater requirements:

Chapter 1 – General Provisions

Chapter 5 – Residential Use Development Standards

Chapter 15 – Commercial Uses

Chapter 25 – Industrial Development Standards

Chapter 30 – Off Street Parking

Chapter 40 – Automobile Service Station

Land Grading and Erosion Control Ordinance

The County anticipates updating the Land Grading and Erosion Control Ordinance (Chapter 16.44 of County Code) as follows:

- Update references to latest State NPDES General Permit for Construction Activities (2003)
- Update references to erosion and sediment control specifications
- Consider the need for distinguishing better between County-required erosion and sediment control plans and State-required stormwater pollution prevention plans (SWPPPs)

Water Use and Conservation Ordinance

The County will review the Water Use and Conservation Ordinance (County Code Chapter 14.10) and will:

- Consider revisions as needed to any language that potentially conflicts with stormwater quality protection objectives
- Consider amending the County's recommended plant and tree list (County Code Chapter 14.10.080) to include species that are appropriate for use with vegetated stormwater quality treatment BMPs

Requirements for Controlling Downstream Erosion and Protecting Stream Habitat

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the County will consider whether new requirements are needed to protect stream habitat from erosion.

City of Sacramento

General Plan

The City of Sacramento General Plan is strongly oriented toward physical development of land uses, the circulation network, and supporting facilities and services. Conformance of proposed projects and improvements with the General Plan is a major step toward their approval. The current 1986 to 2006 General Plan replaced the extensively amended 1974 General Plan. In October 2003, the City began the process of updating the General Plan; adoption of the new plan is anticipated in 2006. During the update process, water quality and watershed protection principles will be addressed as necessary. The City will consider example language used by other agencies in their General Plans, as described in Appendix D.

Community and Specific Plans

The City will consider including appropriate water quality protection language in new and updated community and specific plans. The community plans tentatively scheduled for updates include: the Airport-Meadowview/South Sacramento Community Plan in 2004 and the North Sacramento Community Plan in 2006. The City will consider example language used by other agencies in their community plans, as described in Appendix D.

City Code

Currently, the City's Stormwater Ordinance provides the legal authority to require stormwater quality requirements for new development and redevelopment. Based on the City's initial review, no City codes were identified for revision. The City will consider including appropriate water quality protection language in various portions of the City code as deficiencies or conflicts are identified. The City will consider example language used by other agencies in their codes, as described in Appendix D.

Requirements for Controlling Downstream Erosion and Stream Habitat

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the City will consider whether new requirements are needed to protect stream habitat from erosion.

City of Citrus Heights

General Plan

The City of Citrus Heights adopted the 1993 County General Plan when it incorporated in 1997. The City is about to embark on a process to prepare its own General Plan. It is anticipated that many of the revisions will be consistent with those proposed for the updated County General Plan. During the process, the City will consider ways to integrate the water quality and watershed protection principles outlined in the Stormwater Permit.

Zoning Code

The City adopted the County Zoning Code when it incorporated in 1997 and will consider any amendments necessary, consistent with any changes the County makes to the zoning code, as described above.

Municipal Code

The City adopted the County's Municipal Code when it incorporated in 1997. To be consistent with Sacramento County, the City will consider amending various parts of the Municipal Code, including the Land Grading and Erosion Control Ordinance (16.44 of the Municipal Code) and the Water Use and Conservation Ordinance (14.10 of the Municipal Code).

Requirements for Controlling Downstream Erosion and Stream Habitat

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the City will consider whether new

requirements are needed to protect stream habitat from erosion.

City of Elk Grove

General Plan

The City recently completed a two-year process to develop its own General Plan and adopted the new plan on November 19, 2003. Under contract to the City, the County provided consulting services in spring 2003 to review and comment on the Conservation, Land Use, Open Space and Housing Elements of the General Plan, and recommended ways to integrate the water quality and watershed protection principles found in the Stormwater Permit. These recommendations were considered by the City planners and appropriate concepts were included in the final General Plan. No further updates are planned in the near future.

Community and Specific Plans

The City will consider including appropriate water quality protection language in future community and specific plans and will consider example language used by other agencies in their community/specific plans, as described in Appendix D.

Design Guidelines for Multi-Family Residential Development

The City of Elk Grove adopted design guidelines for single family residential subdivisions and commercial developments in 2003. Efforts were made to consider and integrate, as feasible, the water quality and watershed protection principles outlined in the Stormwater Permit. For example, to address Permit Provision 16a.i related to minimizing impervious surfaces in new and redevelopment, the design guidelines include a policy statement that the City encourages the use of pervious and alternative pavements (V.A.2.17) and another policy that driveways should not dominate the front yard in residential subdivisions (III., B, 2., 14).

Design guidelines for multi-family residential development are currently being drafted and are expected to be published in 2004. The planners will again consider and integrate water quality protection principles as appropriate.

Zoning Code

The City of Elk Grove adopted the County Zoning Code when it incorporated in 2000. The City is planning to create and adopt its own zoning code in the near future and will consider amending the language in Title III (Use Regulations and Development Standards) to integrate water quality concepts and eliminate potential conflicts, as noted previously for the County.

Municipal Code

The City adopted the County's Municipal Code when it incorporated in 2000. Like Sacramento County, the City will consider amending various parts of the Municipal Code, including the Land Grading and Erosion Control Ordinance (16.44 of the Municipal Code) and the Water Use and Conservation Ordinance (14.10 of the Municipal Code).

Requirements for Controlling Downstream Erosion and Stream Habitat

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the City will consider whether new requirements are needed to protect stream habitat from erosion.

City of Folsom

General Plan

Starting in about late 2004, the City of Folsom plans to update its current General Plan (which was last updated in 1993) and will incorporate water quality and watershed protection principles as needed.

Municipal Code

City of Folsom planners will review and evaluate the need for amendments to the following chapters of the Folsom Municipal Code to integrate water quality concepts and eliminate potential conflicts:

Chapter 14.29 – Grading

Chapter 14.33 – Hillside Development Standards

Chapter 17.57 – (Zoning Code) Parking Requirements

Chapter 17.72 – (Zoning Code) Service Stations

Community and Specific Plans

The City will consider including appropriate water quality protection language in community and specific plans for future development. This may include the area south of Highway 50 if the city annexes the area.

Requirements for Controlling Downstream Erosion and Stream Habitat

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the City will consider whether new requirements are needed to protect stream habitat from erosion.

City of Galt

General Plan

The City of Galt recently began the process to update their General Plan. The process is called "20/20: A Vision for the Future" and will include numerous community workshops. The City planners are aware of the requirement to incorporate water quality and watershed principles in the General Plan update and will coordinate with the other Permittees to share information.

Zoning Code

The City will consider changes to its Zoning Code after reviewing changes proposed by the County to its zoning code, as described earlier in this chapter.

Municipal Code

The City recently adopted changes to the Galt Municipal Code to include a Stormwater Ordinance (Chapter 16.10). Further changes will be considered after reviewing changes proposed by the County and other Permittees to their codes, as described earlier in this chapter.

***Requirements for Controlling
Downstream Erosion and
Stream Habitat***

Upon completion of the Permittee's Erosion Potential Study (Stormwater Permit Provision MRP III), the City will consider whether new requirements are needed to protect stream habitat from erosion.

Chapter 8

Development Standards Implementation Process

Stormwater Permit Provision 19f requires the DSP to describe the process used to implement development standards, including all proposed modifications to the process. Part of this requirement is satisfied by Chapters 3 and 4, which describe and illustrate the steps and tools in the development review process. Also, Chapter 5 describes the existing development standards, and Chapters 6 and 7 describe proposed amendments. This chapter presents the proposed implementation process and schedule for amending the key development standards as described in Chapter 6. Roles and responsibilities of the various municipal departments for the six Permittees are also identified.

Proposed Implementation Process and Schedule for Amending Development Standards

Table 8–1 presents the Permittees’ proposed tasks and schedule for amending their existing development standards as described in Chapter 6. The dates shown in the schedule are subject to change, based on the date of final DSP approval by the Regional Board.

Responsibilities for Implementing and Amending Development Standards

Table 8–2 outlines the tasks involved in implementing and amending development standards and the roles and responsibilities of the various municipal departments of the six Permittee agencies.

Table 8–1. Projected Development Standards Implementation Schedule

Task	Schedule/Target Date
Submit Development Standards Plan (DSP) to Regional Board	December 1, 2003
Regional Board reviews DSP and works with Permittees if needed to make changes before public review process	January – March, 2004*
30-day Public Review Process for DSP (hosted by Regional Board, with mailings to their “interested parties” list and additional stakeholders identified by Permittees, if any)	April 2004*
Regional Board adopts DSP	June 1, 2004*
Each Permittee completes amendments to its development standards (codes, ordinances, standards) to enable them to:	June 1, 2004 – June 1, 2005*
1) require SWQ controls for new and redevelopment projects in 8 priority project categories,	(Note: Permit requires this step to be completed 1 year following Regional Board adoption of DSP)
2) apply a BMP matrix to aid with selection of BMPs (based on land use and activities/pollutants of concern), and	
3) require developers to use specified volume and flow-based numerical design criteria for designing treatment BMPs	
Prepare a new Sacramento Design Manual for Stormwater Quality Facilities (to replace existing <i>Guidance Manual for On-Site Stormwater Quality Control Measures</i> and incorporate criteria for regional BMPs)	June 1, 2004 – June 1, 2005* (This process could start earlier, if more than 1 year is needed)
Development community is required to comply with new requirements (except if project was previously approved)	June 1, 2005*

**Dates are approximate and will depend on actual date that Regional Board conducts public review process and officially adopts the DSP.*

Table 8–2. Roles and Responsibilities for Implementing and Amending Development Standards

Roles/Responsibilities	Permittee/Responsible Dept.					
	Sac County	City of Sac	Citrus Hts	Elk Grove	Folsom	Galt
Oversee compliance with development standard provisions in NPDES Permit	Dept. Water Resources/ SWQ Section	Utilities – WQ Section	General Services	Public Works	Public Works	Public Works, Building and Planning
Review site plans for conformance to General Plan, zoning and building requirements	Planning	Planning; Building; Utilities – WQ	Community Development — Planning and Building	Planning	Community Development	Public Works, Building and Planning
<i>Plans, Policies and Guidelines</i>						
Manage/oversee General Plan update process.	Planning	Long-Range Planning	Community Development— Planning	Planning	Community Development	Planning
Oversee preparation and implementation of community, specific and natural area protection plans.	Planning	Long-Range Planning	Community Development — Planning	Planning	Community Development	Planning
Oversee preparation and implementation of master plans for parks and trails.	County Parks and various Parks Districts	Parks and Recreation	Sunrise Recreation and Parks District	EG Community Services District	Parks and Recreation	Parks and Rec and Planning
Prepare and implement drainage master plans	DWR/Drainage Dev. Review Section	Utilities	General Services	Public Works	Public Works and Community Development	Public Works
Prepare and update design guidelines	Planning	Planning	Community Development — Planning	Planning	Public Works and Community Development	Public Works and Planning
Manage and Implement CEQA review process, including oversight for EIR preparation	Dept. Env. Review & Assess.	Planning – Environmental Services	Community Development — Planning	Planning	Community Development	Planning

Roles/Responsibilities	Permittee/Responsible Dept.					
	Sac County	City of Sac	Citrus Hts	Elk Grove	Folsom	Galt
Review Specific Plans	Planning	Current and Long-Range Planning	Comm Dev — Planning, General Services	Planning	Community Development	Planning
Ordinances and Codes						
Update zoning ordinance/code	Planning	Planning; Utilities – WQ	Community Development— Planning	Planning	Public Works and Community Development	Planning
Update stormwater ordinance	DWR/SWQ	Utilities – WQ	General Services	Public Works	Public Works	Public Works
Update grading ordinance (erosion control)	DWR/SWQ	Utilities – WQ	Community Development— Building	Multiple City Departments	Public Works	Public Works
Update other relevant ordinances as needed (e.g., water conservation)	Planning	Planning; Utilities – WQ	Community Development— Planning	Multiple City Departments	Public Works and Community Development	Public Works
Implement/enforce codes	Planning; Code enforcement; DWR; LDSIR	Planning; Building; Utilities – WQ;	Comm Dev — Planning, Building, Code Enforcement	Multiple City Departments	Neighborhood Services	Public Works, Building and Planning
Design and Improvement Standards and Manuals						
Write and update design/improvement standards (including stormwater quality) for development projects	DWR/Drainage Dev. Review Section	Utilities – WQ; Devel. Review	General Services	Multiple City Departments	Public Works and Community Development	Public Works
Coordinate update of <i>Guidance Manual for On-Site SWQ Control Measures</i>	DWR/SWQ	Utilities – WQ; Devel. Review	General Services	Public Works	Public Works	Public Works

Appendix A

Development Standards Plan Glossary

Best Management Practices (BMPs) means methods, measures, or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges including stormwater. BMPs include structural and nonstructural controls, and operation and maintenance procedures, which can be applied before, during, and/or after pollution producing activities.

Commercial Development means any development on private land that is not heavy industrial or residential. The category includes, but is not limited to hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities, mini-malls, business complexes, shopping malls, hotels, office buildings, public warehouses, and light industrial complexes.

Construction means clearing, grading, excavating, etc. that results in soil disturbance. Construction includes structure teardown. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility; emergency construction activities required to immediately protect public health and safety; interior remodeling with no outside exposure of construction material or construction waste to stormwater; mechanical permit work; or sign permit work.

Control means to minimize, reduce, eliminate, or prohibit by technological, legal, contractual or other means, the discharge of pollutants from an activity or activities.

Development means any construction, rehabilitation, redevelopment or reconstruction of any public or private residential project (whether single-family, multi-unit or planned unit development); industrial, commercial, retail and other non-residential projects, including public agency projects; or mass grading for future construction. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Development Standards means standards that the Permittees must develop and implement for new development and significant redevelopment projects to control the discharge of stormwater pollutants in post-construction stormwater.

Discharge means when used without qualification the discharge of a pollutant.

General Permit for Construction Activities Stormwater Permit means the general NPDES permit adopted by the State Board, which authorizes the discharge of stormwater from construction activities under certain conditions.

General Permit for Industrial Activities Stormwater Permit means the general NPDES permit adopted by the State Board which authorizes the discharge of stormwater from certain industrial activities under certain conditions.

Infiltration means the downward entry of water into the surface of the soil.

Maximum Extent Practicable (MEP) means the standard for implementation of stormwater management programs to reduce pollutants in stormwater. CWA § 402(p)(3)(B)(iii) requires that municipal permits "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants. See also State Board Order WQ 2000-11.

Municipal Separate Storm Sewer System (MS4) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, alleys, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) owned by a State, city, county, town or other public body, that is designed or used for collecting or conveying stormwater, which is not a combined sewer, and which is not part of a publicly owned treatment works, and which discharges to Waters of the United States.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits under CWA §307, 402, 318, and 405.

Natural Drainage Systems means unlined or unimproved (not engineered) creeks, streams, rivers or similar waterways.

New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

On-Site Stormwater Quality BMPs are stormwater quality BMPs that serve a particular project or site.

Parking Lot means land area or facility for the parking or storage of motor vehicles used for businesses, commerce, industry, or personal use, with a lot size of 5,000 square feet or more of surface area, or with 25 or more parking spaces.

Permittees means Co-Permittees and any agency named in this Order as being responsible for permit conditions within its jurisdiction.

Pollutants means those substances defined in CWA §502(6) (33.U.S.C.§1362(6)), and incorporated by reference into California Water Code §13373.

Project means all development, redevelopment, and land disturbing activities. The term is not limited to "Project" as defined under CEQA (Pub. Resources Code §21065).

Receiving Waters means all surface water bodies in the Central Valley Region that are identified in the Basin Plan.

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site. Redevelopment includes, but is not limited to: the expansion of a building footprint; addition or replacement of a structure; replacement of impervious surface area that is not part of a routine maintenance activity; and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Regional Administrator means the Regional Administrator of the Regional Office of the U.S. Environmental Protection Agency (EPA) or the authorized representative of the Regional Administrator.

Regional Stormwater Quality BMPs are stormwater quality BMPs which serve large areas (typically about 20 – 600 acres), are located in the public right-of-way, and are owned, operated, and maintained by public agencies.

Restaurant means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC Code 5812).

Retail Gasoline Outlet means any facility engaged in selling gasoline and lubricating oils.

Runoff means any runoff including stormwater and dry weather flows from a drainage area that reaches a receiving water body or subsurface. During dry weather it is typically comprised of base flow either contaminated with pollutants or uncontaminated, and nuisance flows.

Source Control BMP means any schedules of activities, prohibitions of practices, maintenance procedures, managerial practices or operational practices that aim to prevent stormwater pollution by reducing the potential for contamination at the source of pollution.

Stormwater means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

Structural BMP means any structural facility designed and constructed to mitigate the adverse impacts of stormwater and urban runoff pollution (e.g. canopy, structural enclosure). The category may include both Treatment Control BMPs and Source Control BMPs.

Treatment means the application of engineered systems that use physical, chemical, or biological processes to remove pollutants. Such processes include, but are not limited to, filtration, gravity settling, media absorption, biodegradation, biological uptake, chemical oxidation and UV radiation.

Treatment Control BMP means any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media absorption or any other physical, biological, or chemical process.

U.S. EPA Phase I Facilities means facilities in specified industrial categories that are required to obtain an NPDES permit for stormwater discharges, as required by 40 CFR 122.26(c). These categories include facilities subject to stormwater effluent limitation guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR N); manufacturing facilities; oil and gas/mining facilities; hazardous waste treatment, storage, or disposal facilities; landfills, land application sites, and open dumps; recycling facilities; steam electric power generating facilities; transportation facilities; sewage of wastewater treatment works; and light manufacturing facilities.

Vehicle Maintenance/Material Storage Facilities/Corporation Yards means any Permittee owned or operated facility or portion thereof that conducts industrial activity, operates equipment, handles materials, and provides services similar to Federal Phase I facilities; performs fleet vehicle service/maintenance on ten or more vehicles per day including repair, maintenance, washing, and fueling; performs maintenance and/or repair of heavy industrial machinery/equipment ; and stores chemicals, raw materials, or waste materials in quantities that require a hazardous materials business plan or a Spill Prevention, Control, and Counter-measures (SPCC) plan.

Water Quality Standards and Water Quality Objectives means water quality criteria contained in the Basin Plan, the National Toxics Rule, the California Toxics Rule, and other state or federally approved surface water quality plans. Such plans are used by the Regional Board to regulate all discharges, including stormwater discharges.

Waters of the State means any surface water or groundwater, including saline waters, within boundaries of the state.

Waters of the United States means:

- a. All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- b. All interstate waters, including interstate wetlands;
- c. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
 1. Which are or could be used by interstate or foreign travelers for recreational or other purposes;

2. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce;
or
 3. Which are used or could be used for industrial purposes by industries in interstate commerce;
- d. All impoundments of waters otherwise defined as waters of the United States under this definition;
 - e. Tributaries of waters identified in paragraphs (a) through (d) of this definition;
 - f. The territorial sea; and
 - g. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraph (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.22(m), which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to man-made bodies of water, which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with U.S. EPA.

Wet Season means the calendar period beginning October 1 through April 30.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Appendix

B

ORDER NO. R5-2002-0206

NPDES NO. CAS082597

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF SACRAMENTO AND
CITIES OF CITRUS HEIGHTS, ELK GROVE, FOLSOM, GALT AND SACRAMENTO
STORM WATER DISCHARGES FROM
MUNICIPAL SEPARATE STORM SEWER SYSTEMS
SACRAMENTO COUNTY

The following is an excerpt from the permit, related to Development Standards.

Development Standards

16. The Permittees shall minimize the short and long-term impacts on receiving water quality from new development and significant redevelopment. In order to reduce pollutants in runoff flows from these sources to the MEP, each Permittee shall review and update its existing program, which shall, at a minimum, address the following:
 - a. Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. Such water quality and watershed protection principles and policies shall consider the following:
 - i. Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality.
 - ii. Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s.
 - iii. Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones.

- iv. Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges.
 - v. Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff.
 - vi. Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss.
 - vii. Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment.
 - viii. Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat.
- b. Prior to project approval and issuance of local permits for new development and significant redevelopment, each Permittee shall review the proposed project plan and require measures to ensure that all development is in compliance with the Permittee's storm water ordinances, local permits, and other applicable requirements.
17. By **1 December 2003**, each Permittee, except the City of Galt, shall develop and submit for public review and comment, and Executive Officer approval a **Development Standards Plan (DSP)** which describes measures to reduce pollutant discharges to the MEP from all new development and significant redevelopment projects. The City of Galt shall meet this requirement by **1 July 2004**. To ensure consistency with the applicable portions of State Board Order WQ 2000-11, the DSP shall provide the following information:
- a. A description of existing Development Standards, if any, including project categories, BMP requirements and numeric sizing criteria;
 - b. A comparison of existing development standards to the requirements established under State Board Order WQ 2000-11 and/or other applicable directives; and
 - c. A description of the proposed modifications to the Development Standards to ensure that, at a minimum, they are consistent with the requirements of State Board Order WQ 2000-11 and this Order.
18. Within one year of approval of the DSP, each Permittee shall amend, or adopt if needed, its own local Development Standards, including amendment of ordinances as needed.

19. Upon amendment or adoption of local Development Standards, each Permittee shall ensure that all new development and significant redevelopment projects falling under the priority project categories listed below are reviewed and conditioned for compliance with the Development Standards. The local Development Standards shall apply to all priority projects or phases of priority projects that do not have the following by the adoption date for the local Development Standards: approval by the City or County Engineer, permit for development or construction, an approved special permit, or an approved tentative map.
- a. **Priority Development Project Categories:** Development Standards requirements shall apply to all new development and significant redevelopment projects falling under the priority project categories listed below. The term “significant redevelopment” is defined as the creation or addition of at least 5,000 square feet of impervious surfaces on an already developed site. Significant redevelopment includes, but is not limited to expansion of a building footprint, or replacement of a structure; replacement of impervious surface that is not part of a routine maintenance activity; and land-disturbing activities related to structural or impervious surfaces. Where significant redevelopment results in an increase of less than 50 percent of the impervious surfaces of a previously existing development, and the existing development was not subject to Development Standards, the BMP design standards discussed below apply only to the addition, and not to the entire development. Priority Development Project Categories are listed below.
- i. Home subdivisions with ten housing units or more. This category includes single-family homes, multi-family homes, condominiums, and apartments.
 - ii. Commercial developments. This category is defined as any development on private land that is not for heavy industrial or residential uses where the impervious land area for development 100,000 square feet or more. The category includes, but is not limited to hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, commercial nurseries, car wash facilities, mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses, and other light industrial facilities.
 - iii. Automotive repair shops. This category is defined as a facility that is categorized by one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where the total impervious area for development is 5,000 square feet or more.
 - iv. Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812) and has 5,000 or more feet of impervious area.

- v. Hillside developments 5,000 square feet or more of impervious area. This category is defined as any development that creates 5,000 square feet of impervious surface in an area with known erosive soil located in an area with natural slopes having a twenty-five percent or greater grade.
 - vi. Parking lots exposed to rainfall that are 5,000 square feet or more, or with 25 or more parking spaces. This category is defined as an uncovered impervious area for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.
 - vii. Street, roads, highways, and freeways. This category includes any paved surface five acres or greater used by automobiles, trucks, motorcycles, and other vehicles.
 - viii. Retail Gasoline Outlets. “Retail Gasoline Outlet” is defined as any facility engaged in selling gasoline with 5,000 square feet or more of impervious surface area.
- b. BMP Requirements: The Development Standards Plan shall include a list of recommended source and/or structural treatment control BMPs for all new development and significant redevelopment projects falling under the above priority project categories or locations. At a minimum, Retail Gasoline Outlets shall be required to use the BMPs listed in the California Storm Water Quality Task Force, March 1997 BMP Guide for Retail Gasoline Outlets.
 - c. Numeric Sizing Criteria: As a part of the DSP, the Permittees shall review their existing numeric sizing criteria for structural treatment BMPs and ensure that it is comparable to the following numeric sizing criteria:
 - i. Volume-based BMPs shall be designed to mitigate (infiltrate or treat) either:
 - a) The volume of runoff produced from a 24-hour 85th percentile storm event, as determined from the local historical rainfall record; or
 - b) The volume of runoff produced by the 85th percentile 24-hour rainfall event, determined as the maximized capture storm water volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or
 - c) The volume of annual runoff based on unit basin storage volume, to achieve 80 percent or more volume treatment by the method recommended in California Storm Water Best Management Practices Handbook – Industrial/Commercial, (1993).

- ii. Flow-based BMPs shall be designed to mitigate (infiltrate or treat) either:
 - a) The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two; or
 - b) The maximum flow rate of runoff, as determined from local historical rainfall records, that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.

- d. Equivalent Numeric Sizing Criteria: The Permittee may develop or use any equivalent numeric sizing criteria or performance-based standard for post-construction structural treatment BMPs as part of these requirements. Such equivalent sizing criteria may be authorized for use in place of the above criteria. In the absence of an equivalent numeric sizing criteria, the criteria contained above shall be implemented.

- e. Pollutants and Activities of Concern: The DSP shall consider pollutants of concern or activities of concern in identifying appropriate BMPs for new development or significant redevelopment projects. In selecting BMPs, the following shall be considered: (1) the target pollutants; (2) land use and pollutants associated with that land use type; (3) pollutants expected to be present on site at concentrations that would pose potential water quality concerns; and (4) changes in flow rates and volumes resulting from the development project and sensitivity of receiving waters to changes in flow rates and volumes.

- f. Implementation Process: The DSP shall describe the process used to implement the Development Standards and all proposed modifications to the process. The process shall also include identification of the roles and responsibilities of various municipal departments in implementing these standards, as well as any other measures necessary for the implementation of these standards.

- g. Infiltration and Groundwater Protection: To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

- h. Downstream Erosion: The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm

water discharge volumes and durations should also be considered in the Development Standards.

- i. **Waiver Provision:** The Permittee may provide for a project to be waived from the requirement of implementing structural treatment BMPs if infeasibility can be established as described below.
- j. **Conflicts with Local Practices:** The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications.

20. **Regional Storm Water Mitigation Program:** A Permittee may apply to the Regional Board for approval of a regional or sub-regional storm water mitigation program to substitute in part or wholly for Development Standard requirements. Upon review and a determination by the Executive Officer that the proposal is technically valid and appropriate, the Regional Board may consider for approval such a program if its implementation will:

- a. Result in equivalent or improved storm water quality;
- b. Protect stream habitat;
- c. Promote cooperative problem solving by diverse interests;
- d. Be fiscally sustainable via secured funding; and
- e. Be completed in five years, including the construction and start-up of treatment facilities.

Nothing in this provision shall be construed as to delay the implementation of Development Standard requirements as required by this Order.

21. **Waiver Program:** Anytime during the term of the Order, a Permittee may propose a waiver program that would require any developers receiving waivers to transfer the savings in cost, as determined by the Permittee, to a storm water mitigation fund. Any proposed waiver program shall be subject to the approval of the Executive Officer. Any Permittee may consider a waiver for projects where structural treatment BMPs are infeasible. The Permittee shall only grant a waiver when all appropriate structural treatment BMPs have been considered and rejected as infeasible. The Permittee shall notify the Regional Board **within one month** of each waiver issued and shall include the name of the person granting each waiver. Funds may be used for projects to improve urban runoff quality within the watershed of the waived project. At a minimum, a proposed waiver program shall identify the following:

- a. The entity or entities that will manage (i.e., assume full responsibility for) the storm water mitigation fund;
- b. The range and types of acceptable projects for which mitigation funds may be expended;
- c. The entity or entities that will assume full responsibility for each mitigation project, including its successful completion; and

- d. How the dollar amount of fund contributions will be determined and managed.
22. **Maintenance Agreement and Transfer:** Each Permittee shall require that all developments subject to Development Standards and site specific plan requirements provide verification of maintenance provisions for post-construction structural and treatment control BMPs. Verification shall include one or more of the following as applicable:
- a. The developer's signed statement accepting responsibility for maintenance until the maintenance responsibility is legally transferred to another party; or
 - b. Written conditions in the sales or lease agreement that require the recipient to assume responsibility for maintenance; or
 - c. Written text in project conditions, covenants and restrictions for residential properties assigning maintenance responsibilities to a home owner's association, or other appropriate group, for maintenance of structural and treatment control BMPs; or
 - d. Any other legally enforceable agreement that assigns responsibility for maintenance of structural or treatment control BMPs.
23. **California Environmental Quality Act Document Update:** Each Permittee shall incorporate into its CEQA process, within 180 days of the effectiveness date of this Order, procedures for considering potential storm water quality impacts and providing for appropriate mitigation when preparing and reviewing CEQA documents. The procedures shall require consideration of the following:
- a. Potential impact of project construction on storm water runoff;
 - b. Potential impact of project post-construction activity on storm water runoff;
 - c. Potential for discharge of storm water from material storage areas, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas;
 - d. Potential for discharge of storm water to impair the beneficial uses of the receiving waters or areas that provide water quality benefit;
 - e. Potential for the discharge of storm water to cause significant harm on the biological integrity of the waterways and water bodies;
 - f. Potential for significant changes in the flow velocity or volume of storm water runoff that can cause environmental harm; and
 - g. Potential for significant increases in erosion of the project site or surrounding areas.
24. **General Plan Update:** Each Permittee shall do the following:
- a. Evaluate and amend, revise, or update as necessary, its General Plan to include watershed and storm water quality and quantity management considerations and

policies when any of the following General Plan elements are updated or amended: land use, housing, conservation, and open space.

- b. Provide the Regional Board with the draft amendment or revision when a listed General Plan element or the General Plan is noticed for comment in accordance with California Government Code § 65350 *et seq.*

25. **Targeted Employee Training:** Each Permittee shall provide annual training for its employees in targeted positions (whose jobs or activities are engaged in development planning), regarding the requirements of this Order that affect development planning beginning no later than **1 September 2004**.

26. **Technical Guidance and Information for Developers**

- a. Each Permittee shall make Development Standards available to developers as they are adopted/approved.
- b. Within one year of adopting Development Standards, each Permittee shall issue new or amended technical guidance manuals to the development community in that Permittee's jurisdiction for the siting and design of storm water quality BMPs. The technical manual(s) shall at a minimum include:
 - i. Source and treatment control BMP design criteria for BMPs acceptable for use in the local area;
 - ii. Peak flow control criteria to control peak discharge rates, velocities and duration;
 - iii. Expected pollutant removal performance ranges for the BMPs (or references to national databases, technical reports and/or scientific literature); and
 - iv. Maintenance considerations.



Winston H. Hickox
Secretary for
Environmental
Protection

State Water Resources Control Board

Office of Chief Counsel

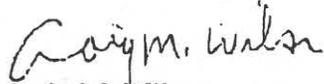
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Gray Davis
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Appendix
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TO: RWQCB Executive Officers

FROM: 
Craig M. Wilson
Chief Counsel
OFFICE OF CHIEF COUNSEL

DATE: DEC 26 2000

SUBJECT: STATE WATER BOARD ORDER WQ 2000-11: SUSMP

2000 DEC 27 A 10:20

STATE OF CALIFORNIA
WATER QUALITY
CONTROL BOARD

On October 5, 2000, the State Water Resources Control Board (State Water Board) adopted a precedential decision concerning the use of Standard Urban Storm Water Mitigation Plans (SUSMPs) in municipal storm water permits. (Order WQ 2000-11; hereafter referred to as "the Order.") The Order arose from the municipal storm water permit in the Los Angeles region. As a precedential decision, the State Water Board has recognized that the decision includes significant legal or policy determinations that are likely to recur. (Gov. Code §11425.60.) The Regional Water Quality Control Board (Regional Water Board) orders must be consistent with applicable portions of the State Water Board's precedential decisions.

In the Order, the State Water Board considered SUSMPs related to new development and redevelopment. The SUSMPs include a list of best management practices (BMPs) for specific development categories, and a numeric design standard for structural or treatment control BMPs. The numeric design standard created objective and measurable criteria for the amount of runoff that must be treated or infiltrated by BMPs. The purpose of the SUSMPs is to control runoff both during and after construction.

Several of the conclusions reached in the Order are likely to recur, and future municipal storm water permits must be consistent with the principles set forth therein.¹ Pursuant to the Clean Water Act, municipal storm water permits must require controls to reduce the discharge of pollutants to the maximum extent practicable (MEP). The Order finds that the provisions in the SUSMPs, as revised in the Order, constitute MEP. The Order also discusses areas where the Regional Water Boards may exercise more discretion.

¹ The Order considered a Phase I storm water permit, applicable to urban areas with populations of 100,000 and greater. The State Water Board will soon embark on Phase II, which will include municipal permits for smaller municipalities. The Order did not address Phase II requirements, which may be different than Phase I requirements.

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RWQCB Executive Officers

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DEC 26 2000

1. The Order finds that the design standard in the SUSMPs, which essentially requires that 85 percent of the runoff from specified categories of development be infiltrated or treated, reflects MEP. It is conceivable that the specific design standard could vary depending on such factors as rainfall and soil characteristics.
2. The Order determined that SUSMPs appropriately applied to the following categories of development: single-family hillside residences, 100,000 square foot commercial developments, automotive repair shops, restaurants, home subdivisions with 10 to 99 housing units, home subdivisions with 100 or more housing units, and parking lots with 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to storm water runoff. Redevelopment projects that are within one of these categories are included if the redevelopment adds or creates at least 5,000 square feet of impervious surface to the original developments; if the addition constitutes less than 50 percent of the original development, the design standard only applies to the addition. The Order approved a waiver from compliance with the design standard where there is a risk of groundwater contamination because a known unconfined aquifer lies beneath the land surface or an existing or potential underground source of drinking water is less than 10 feet from the soil surface.
3. The Order allows broader discretion by the Regional Water Boards to decide whether to include additional types of development in future SUSMPs. These areas for potential future inclusion in SUSMPs include retail gasoline outlets, ministerial projects (only discretionary projects are included in the approved SUSMPs), and projects in environmentally sensitive areas. If Boards include these types of developments in future permits, the Order explains the types of evidence and findings that are necessary.
4. The Order encourages regional solutions. The Order endorses establishment of a mitigation fund or "bank" that could be funded by developers who obtain waivers from the design standards. The Order explains that such a funding mechanism must be developed after consultation with appropriate local agencies.

The SUSMPs as developed by the Los Angeles Regional Water Board resulted from a requirement in a municipal storm water permit to draft and submit a proposal. The Regional Water Board then made revisions to the SUSMPs, and the State Water Board made further revisions prior to approving the SUSMPs. In light of the specificity and detail in the Order, Regional Water Boards should simply incorporate SUSMP requirements for new development and redevelopment into new municipal permits, rather than adopting a process of submittal, review and revision of proposals. In adopting SUSMPs in permits, the requirements should be substantially similar to the SUSMPs approved in the Order. If, for example, the Regional Water Board determines that a different design standard than 85 percent of the runoff is appropriate, the permit findings should explain how the alternative design standard is generally equivalent to the standards approved in the Order, and why the alternative standard is appropriate to the area. The

RWQCB Executive Officers

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general principles of the Order—that design standards for BMPs for new development and redevelopment are required—must be implemented.

cc: Edward C. Anton
Acting Executive Director

Appendix D-1

County of Sacramento

Summary of Existing Programs for New Development

Appendix D-1: County of Sacramento

Water Quality/Watershed Protection Principles and Policies (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	General Language preserving open space and providing shading, language encouraging the preservation of marsh land and riparian areas in Conservation Element (CO-62: Ensure no net loss of marsh and riparian woodland acreage, values or functions.)
Master/Community Plans	Not addressed at all.
Zoning Code	Parking lot shading and landscaping requirements, planter area - based on parking spaces. Transportation dictates street widths – Transportation yard parking ordinance in the zoning code limits impervious surface by preventing the paving of front yards.
Building Code	Not addressed.
Other	

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Section I of Conservation Element addresses Surface Water Quality. CO-9 states that “Community and specific plans shall specify urban runoff control strategies and requirements, consistent with Master Drainage Plans and Public Work’s urban runoff management program , for development in newly urbanizing areas and identify sites where retention and treatment are warranted consistent with discharge permit requirement and county-wide runoff measures.” CO-9-12 address water quality. CO-13-15 require for the minimizing of erosion by landscaping and design during and after construction
Master/Community Plans	As required in General Plan language, drainage master plans are required to contain a plan for treating stormwater runoff. Standard language is required to be included with these plans.
Zoning Code	Zoning code has no language requiring stormwater quality controls.
Building Code	No language.
Improvement Standards	Include revised tables in Improvement Standards or refer to Storm Water Quality Guidance Manual.
County Code (Stormwater Quality Ordinance)	Language is not sufficient to allow County to require SWQ treatment – conditioning mechanism is during CEQA/Planning processes.
Title 22	Land Development Guidelines

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Section V of the Conservation Element contains information regarding Habitat Protection. CO-60 states “Marshland and riparian areas of special significance shall be designated as natural preserves on the General Plan.” CO-62 states “Ensure no net loss of marsh and riparian woodland acreage, values or functions.” CO-64 states that “Seasonal and permanent marshland within designated natural preserves shall not be drained or filled for the purpose of converting the land to another use. CO-67 states that “Parcels shall not be created wherein much of the parcel area would comprise marsh or riparian habitat rendering the parcel unbuildable except when within a floodplain corridor or to be dedicated to and maintained by the County for flood control, drainage, and wetland maintenance.” CO-117 provides for a transition zone adjacent to stream corridors of 50 to 150 feet. CO-122 states “Secure easement or fee title to open space lands within corridor as a condition of development approval.”
Master/Community Plans	
Zoning Code	Natural streams combining zone – restricts development along natural streams in the north area in the 100 year flood plain. Parkway Corridor Combining Zone – used to regulate property along the American River within the unincorporated County. For complete document, see Tools Memo.
Guidance Manual for Design of Multi-functional Drainage Corridors	Guidance manual prepared by County to establish standards for design of channels in order to provide improved water quality, habitat, etc.
Improvement Standards	Standard trapezoidal channel design language. Recent change, concrete channels are only allowed if approved by Director.

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	CO-13 through 15 state that “Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.” “Roads and structures shall be designed to minimize grading on slopes above 20 percent.” CO-66 states that “Encroachments within the designated floodway of Sacramento waterways shall be consistent with policies to protect marsh and riparian areas.” CO-120 states that “Development design shall minimize the total floodplain frontage from which is fenced off from public view.”
Master/Community Plans	No language
Zoning Code	Erosion Zones (Part of Parkway Corridor Combining Zone and Natural Streams Combining Zone) allows for certain development only in certain erosion zones along these waterways. See Tools memo for full text.
Building Code	
Other	
Improvement Standards	No language disallowing open bottom culverts

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Safety Element - SA-5 was written to address mainly safety impacts and flooding concerns. Calls for a comprehensive drainage plan and defines the contents of this plan (i.e. identify future 100 year flood elevations associated with build-out, identify potential locations for sedimentation ponds and other stormwater treatment facilities, etc.) Language already exists in CO 9 through 12 requiring water quality facilities in newly developing areas.
Master/Community Plans	Drainage Master Plans have no current requirement to define estimated pollutant load but are required to identify water proposed water quality facilities.
Zoning Code	No language.
Building Code	
Other	

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	CO-13 through 15 have language regarding erosion controls for pre and post construction. See previous example for exact language. SA-4 states “The County shall prohibit development on ground surfaces which exceed 40% in slope, such as the bluff areas along the American River. Development shall be set back from these slopes at a distance to be determined by the Public Works Department.”
Master/Community Plans	No language.
Zoning Code	Parkway Corridor Combining Zone and Natural Streams Combining Zone – these documents identify erosion zones along creeks and the American river. Development is limited depending on the zone.
Building Code	
Erosion Control Ordinance	No language regarding development in erosion prone areas.

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	CO-9 through 12 cover surface water quality on a regional basis. See previous sections for this text. On-site issues not addressed.
Master/Community Plans	As stated previously, SA-5 outlines the requirements for master drainage plans, and water quality facility locations are included on this list. Does not include requirements for on-site measures.
Zoning Code	No language.
Building Code	
Improvement Standards	Improvement Standards currently include decision matrix from the Guidance Manual which requires on-site and regional stormwater treatment measures depending on land use, project size, etc.
CEQA	Current conditional language requires stormwater quality facilities if applicable.

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	No language addressing discharge rates and velocities.
Master/Community Plans	Drainage master plans currently address peak discharge rates for flood control purposes. Velocities are not addressed. Since Sacramento County is relatively flat, velocities are not typically a problem.
Zoning Code	No language.
Building Code	
Improvement Standards	Improvement Standards specify that channels will be designed to convey the 100 year flood event and minimum and maximum velocities are specified (2 f/s – 10 f/s depending on type of construction).

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection (*note conflicts, if any*)

General Plan Policy CO-25 states that “Should the Board of Supervisors determine that there is a significant adverse effect on ground water, including effects on quality, no building permits for urban commercial and residential uses shall be issued.” Besides this, the County does not have a policy restricting the use of infiltration.

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other (*note conflicts, if any*)

At this time, the County limits discharges from new development during the master plan process primarily for the purpose of flood control.

Appendix D-2

City of Sacramento

Summary of Existing Programs for New Development

Appendix D-2: City of Sacramento

Water Quality/Watershed Protection Principles and Policies (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	No Policy.
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	<p>Utilities Storm Drainage - Page 40 OBJECTIVE 1: Provide a storm drainage system that achieves water quality objectives for the Sacramento and American Rivers, and that relieves pressure on the existing combined system in the downtown area.</p> <p>POLICY 1.5: Design the storm drainage system to meet all City/National Pollutant Discharge Elimination System (NPDES) and water quality requirements. POLICY 1.7: Upgrade all existing storm drainage facilities in the Richards Boulevard area to meet current City standards.</p>
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	No policy
South Sacramento	No policy
Airport Meadowview	No policy
Other Plans	
65 th Street/University Transit Village Plan	<p>GOALS AND POLICIES</p> <p>C1. LAND USE</p>

	<p>Existing Program</p> <p>Open Space and Community Facilities - Page 15 Goal 10 - Promote a relationship to the natural environment and increase human comfort through use of appropriately suited vegetation. 10.1 A minimum of 10 percent of the site shall be landscaped and pervious surfaces. Landscaping that serves as a storm water treatment element and/or pedestrian plazas may be used to satisfy this requirement.</p> <p>C3. CIRCULATION/INFRASTRUCTURE</p> <p>Utilities - Page 28 Goal 26 - Ensure a balanced approach to resolving drainage and sewer issues through the transit village area. <u>26.2:</u> In order to reduce impacts to existing and planned storm water and sewer drain system, new development will have a minimum target level of site perviousness of 10% (note: on site design improvements (e.g., parking lots as detention) off site improvements or fees may be required in lieu of this requirement). Site design mitigation measures, subject to the approval of the Utilities Director, may include: Barrier retention (berm, wall, planter, etc.), Depression storage (lawn, garden, parking lot, pond, athletic field, etc.), Land leveling, Terracing, Porous pavement, Driveway or parking lot under drain, shallow percolation (leach field), deep percolation (well), above-grade storage (rooftop, water tower), sub-grade storage (tank, rock layer), soil modification, re-vegetation (floor, canopy), structure on piers. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Storm Management Program in order to reduce pollutants in urban runoff to the maximum extent possible.</p> <p>Goal 27 - Reduce urban runoff. Page 28 <u>27.1</u> New development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p>
R Street Corridor	No policy
Citywide Residential Design Standards - Minimum Design Standards For New Construction Of Single And Two Family Dwellings	<p>1. Site Design Standards Page 2</p> <p>B. Landscaping (Required): Front yard and corner lot street side yard landscaping shall be provided.</p> <p>1. Front and street side yard landscaping provided including: shade tree(s), lawn, and automatic sprinkler system for irrigation. Note: Drought tolerant and thematic plantings are encouraged.</p>
Single-Family Residential Design Principles	<p>RESIDENTIAL DESIGN ELEMENT:</p> <p>DRIVEWAYS/ENTRY WALKS</p> <p>Principle: Creative driveway entry walk design with the use of the quality materials, are scaled to the pedestrian, enhancing overall neighborhood appeal. Page 8</p> <p>Encourage:</p> <ul style="list-style-type: none"> o Single-width driveways whenever possible, especially on lots less than 50 feet wide. o “Hollywood” driveways are encouraged o Driveway access to “third” garages and/or R.V. access should be provided with alternative paving materials (i.e., Hollywood driveways, pavers, decorative concrete etc.) <p>Discourage/Avoid:</p> <ul style="list-style-type: none"> o Excessively wide paved driveways that result in smaller yard area, increase heat in the summer and increased storm water runoff.

	<p>Existing Program</p> <p>LANDSCAPING/SIDEWALKS Principle: Consistent quality and design of landscape elements and sidewalks soften the aesthetics of structures and ties neighborhoods together while contributing to energy efficiency. Page 9 Encourage: <ul style="list-style-type: none"> o Utilize drought tolerant landscaping whenever possible. Discourage/Avoid: The planning of water-dependent turf only.</p>
<p>Multi- Family Residential Design Principles</p>	<p>RESIDENTIAL DESIGN ELEMENT:</p> <p>OPEN SPACE/LANDSCAPING Principle: Residential projects should be designed to maximize opportunities for creating usable attractive, and integrated open space. Page 13 Note: Street design (cross sections) shall be compatible with the City Street Design Manual. All new landscaping shall comply with the City of Sacramento Water Conservation Ordinance.</p> <p>DRAINAGE/WATER QUALITY Principle: New multi-family development shall incorporate design features, which provide for on-site source and treatment of urban runoff. Page 21</p> <p><u>Parking Lots</u></p> <ul style="list-style-type: none"> o With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. o Parking lots, which are part of new developments with 1 acre or more impervious area, are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and /or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground. o Integrating treatment measures with areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit A and Exhibit B) describe typical criteria for Vegetated Swales and filter strips, which can effectively be integrated with tree shading. The Department of Utilities, Stormwater Management Program should be contacted for specific design and plan approval. <p><u>Waste Handling Areas</u></p> <ul style="list-style-type: none"> o Provide covered trash and recycling containers in common areas such as recreation, laundry and vehicle wash areas. o Provide grades or slopes of paved areas which direct runoff towards a dead-end sump or a drain connected to the sanitary sewer. o Do not locate a storm drain in the immediate vicinity of a waste handling area. <p><u>Vehicle Wash Areas</u></p> <ul style="list-style-type: none"> o Provide common vehicle wash areas where feasible. o Pave, berm and grade designated vehicle wash areas to drain into the sanitary sewer.

	Existing Program
	Note: New multi-family sites shall be designed to incorporate urban runoff mitigation measures as identified in the City of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures.
Smart Growth Principles	SMARTH GROWTH IMPLEMENTATION STRATEGY - Page 1 Smart Growth Principles 2. Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin) 11. Promote resource conservation and energy efficiency
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	IV. DRAINAGE / WATER QUALITY OPTIONS - Page 10 With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Stormwater Management Program in order to reduce pollutants in urban runoff to the maximum extent practicable. Parking lots which are part of new developments with one (1) acre or more of impervious area are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and/or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground. Integrating treatment control measures within areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit D and Exhibit E) describe criteria for vegetated swales and filter strips, which can be integrated effectively with tree shading. The Department of Utilities’ Stormwater Management Program should be referred to for specific design criteria. Contact the Department of Utilities for plan approval requirements related to stormwater treatment control measures. Trees planted within stormwater runoff areas should only be species adapted to heavy to moderate irrigation, such as riparian species.
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	No policy
American River Parkway Plan	No policy
North Natomas Development Guidelines	North Natomas Development Guidelines OVERVIEW - page 3 o An extensive network of pedestrian and bike trail connections linking activity centers with streets, transit routes, and linear parkways. CIRCULATION - page 7 <u>Streets</u> Street Landscaping: Landscaping along major streets should be park like in character with the sidewalk separated from the roadway to serve as a safe pedestrian route and decrease the impact of soundwalls, when required. Promote the quick shading of streets with tree canopies by using landscaped median strips along major streets and trees on both sides of narrow local streets. Use attractively landscaped medians or corner easements as the gateways to the community and each neighborhood. Along alleys and cul-de-sacs,

	<p>Existing Program</p> <p>allow for landscape opportunities, such as mini-parks, tree wells, etc.</p> <p>PUBLIC OPEN SPACE, PARKS, URBAN FOREST AND WATERWAYS - page 11</p> <p><u>Open Space Opportunities:</u> Establish a hierarchy of public and private open space opportunities including: Regional Park, Community Parks, Neighborhood Parks, Pocket parks, Parkway with drainage, ped/bike trails, roadway, and utility corridors, village greens and squares, community gardens, agricultural buffers and open space corridors, tot-lots and playgrounds, plazas and courtyards, landscape features – entryways, gateways and medians, Witter Ranch Historic Farm. Open space opportunities should be designed to provide public view site lines; connections between other open space areas; . . .</p> <p><u>Parks:</u> Public parks serves as neighborhood and community “anchors”. . . . Allow for topographic variations within the park and design for storm water detention.</p> <p><u>Linear Parkways:</u> Linear parks are community or neighborhood parks that serve the dual purpose of providing a trail system for walkers, joggers, and bicyclists.</p> <p><u>Urban Forest:</u> Public and private open space areas shall meet the following urban forest guidelines:</p> <ol style="list-style-type: none"> 1. Design landscaping around infrastructure and buildings to maximize energy conservation and human comfort. 3. Promote biodiversity and pollution stability. 4. Minimize irrigation required through appropriate species selection, landscape and irrigation design, reclamation of water runoff, and education. <p>Urban/Agriculture Buffer: Using the urban forest guidelines specified above, property owners adjacent to the urban/agriculture buffer along the west and north sides of the community plan area should cooperatively design a buffer of trees and other species to demarcate the urban edge from the agricultural uses, including the Witter Ranch Historic Farm. Incorporate drought tolerant and other native plants to reduce maintenance costs, conserve water, and encourage native wildlife species to frequent the area.</p> <p>Freeway Landscaped Buffer: Using the urban forest guidelines specified above, the property owners along the Interstate 5 and Interstate 80 freeway corridors should design and plant, where not yet planted, a landscaped buffer that reduces the impacts of the freeway from the adjacent uses and allows motorists along the freeway to view special landmarks within the North Natomas Community.</p> <p>Street Landscaping: Use the urban forest guidelines specified above when selecting the trees and other plant species along streets throughout the North Natomas community.</p> <p>Habitat Opportunities: Define a hierarchy of habitat opportunities throughout the community including: drainage corridors, detention basins, utility corridors, natural areas within developed parks, Fisherman’s Lake, Witter Ranch Historic Farm, and the swale, as well as the ag/urban and freeway buffer areas. Each developer is required to participate in the Habitat Conservation Plan, once adopted, to provide on- or off-site habitat value land for plant and animal species.</p>
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	<p>Existing Program</p> <p><u>Waterways</u></p> <p>Drainage Canals and Basins: Drainage rights-of-way are encouraged to accommodate the following multiple uses as well as serve as stormwater drainage facilities: habitat value land, open space opportunities, parks, bikeways/walkways, community gardens, and urban forest.</p> <p>The perimeters of the drainage canals and basin should be used as pedestrian bicyclist connections. Landscaping should be designed for shade, as a view screen, to frame landmarks, and to buffer urban uses from agricultural uses, as well as withstand likely inundation of stormwater.</p> <p>Water Amenities: Accommodate active and passive recreational opportunities around water amenities – i.e., pocket parks, parks courses, picnic areas.</p>
Zoning Code	No policy
Building Code	No policy

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Section 6 Conservation and Open Space Element</p> <p><u>PRESERVATION OF NATURAL RESOURCES</u></p> <p><u>Goal A:</u> Implement the Master Plan for Park Facilities and Recreation Services. Page 6-12</p> <p><u>Policy 1</u> - Continue programs for the planting and maintenance of trees, grass, floral displays and other public landscapes both in the parks and on other City land such as street medians, public buildings and grounds.</p> <p><u>Policy 2</u> - Continue to implement the Heritage Tree program.</p> <p><u>Policy 3</u> - Continue to assist the efforts of the County and the Sacramento Tree Foundation in identifying, acquiring, and creating appropriate locations for urban forests and greenbelt.</p> <p><u>Goal E:</u> Establish development standards for water related open space lands throughout the City to enhance the visual amenities of these uses. Page 6-14</p> <p><u>Policy 1</u> - Explore ways to reverse degradation and pollution and enhance the beauty and wildlife habitats of creeks and drainage canals.</p> <p><u>OUTDOOR RECREATION</u></p> <p><u>Goal A:</u> Conserve and protect the Sacramento and American Rivers, their shorelines and parkways. Page 6-16</p> <p><u>Policy 2</u> - Implement the goals and policies of the Sacramento River Parkway Plan, and amend the Plan to include updated information and recommendations from the <u>Sacramento River Marina Carrying Capacity Study</u>.</p>
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	<p>Utilities</p> <p><u>Storm Drainage</u> - Page 40</p> <p>OBJECTIVE 1: Provide a storm drainage system that achieves water quality objectives for the Sacramento and American Rivers, and that relieves pressure on the existing combined system in the downtown area.</p> <p>POLICY 1.1: Provide for the separation of combined sewer flows in the Railyards planning area.</p> <p>POLICY 1.5: Design the storm drainage system to meet all City/National Pollutant Discharge Elimination System (NPDES) and water quality requirements.</p> <p>POLICY 1.7: Upgrade all existing storm drainage facilities in the Richards Boulevard area to meet current City standards.</p>
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	The comprehensive drainage plan must meet NPDES stormwater regulations and permits. Page 70
South Sacramento	No policy
Airport Meadowview	No policy

	Existing Program
<p>Other Plans</p> <p>65th Street/University Transit Village Plan</p>	<p>GOALS AND POLICIES</p> <p>C2. SITE AND BUILDING DESIGN New Site and Building Design - Page 16 Goal 12: Promote energy efficient design and resource conservation within the district <u>12.3</u> Where feasible, new development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p> <p>C3. CIRCULATION/INFRASTRUCTURE Utilities - Page 28 Goal 26: Ensure a balanced approach to resolving drainage and sewer issues through the transit village area. <u>26.2</u> In order to reduce impacts to existing and planned storm water and sewer drain system, new development will have a minimum target level of site perviousness of 10% (note: on site design improvements (e.g., parking lots as detention) off site improvements or fees may be required in lieu of this requirement). Site design mitigation measures, subject to the approval of the Utilities Director, may include: Barrier retention (berm, wall, planter, etc.), Depression storage (lawn, garden, parking lot, pond, athletic field, etc.), Land leveling, Terracing, Porous pavement, Driveway or parking lot under drain, shallow percolation (leach field), deep percolation (well), above-grade storage (rooftop, water tower), sub-grade storage (tank, rock layer), soil modification, re-vegetation (floor, canopy), structure on piers. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Storm Management Program in order to reduce pollutants in urban runoff to the maximum extent possible. Goal 27: Reduce urban runoff. Page 28 <u>27.1</u> New development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p>
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi-Family Residential Design Principles	<p>RESIDENTIAL DESIGN ELEMENT:</p> <p>DRAINAGE/WATER QUALITY Principle: New multi-family development shall incorporate design features, which provide for on-site source and treatment of urban runoff. Page 21 <u>Parking Lots</u></p> <ul style="list-style-type: none"> o With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. o Parking lots, which are part of new developments with 1 acre or more impervious area, are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and /or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground.

	<p>Existing Program</p> <ul style="list-style-type: none"> o Integrating treatment measures with areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit A and Exhibit B) describe typical criteria for Vegetated Swales and filter strips, which can effectively be integrated with tree shading. The Department of Utilities, Stormwater Management Program should be contacted for specific design and plan approval. <p><u>Waste Handling Areas</u></p> <ul style="list-style-type: none"> o Provide covered trash and recycling containers in common areas such as recreation, laundry and vehicle wash areas. o Provide grades or slopes of paved areas which direct runoff towards a dead-end sump or a drain connected to the sanitary sewer. o Do not locate a storm drain in the immediate vicinity of a waste handling area. <p><u>Vehicle Wash Areas</u></p> <ul style="list-style-type: none"> o Provide common vehicle wash areas where feasible. o Pave, berm and grade designated vehicle wash areas to drain into the sanitary sewer. <p>Note: New multi-family sites shall be designed to incorporate urban runoff mitigation measures as identified in the City of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures.</p>
Smart Growth Principles	<p>IMPLEMENTATION STRATEGY - Page 1 Smart Growth Principles</p> <ul style="list-style-type: none"> 2. Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin) 14. Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	<p>IV. DRAINAGE / WATER QUALITY OPTIONS - Page 10</p> <p>With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Stormwater Management Program in order to reduce pollutants in urban runoff to the maximum extent practicable.</p> <p>Parking lots which are part of new developments with one (1) acre or more of impervious area are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and/or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground.</p> <p>Integrating treatment control measures within areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit D and Exhibit E) describe criteria for vegetated swales and filter strips, which can be integrated effectively with tree shading. The Department of Utilities’ Stormwater Management Program should be referred to for specific design criteria. Contact the Department of Utilities for plan approval requirements related to stormwater treatment control measures.</p> <p>Trees planted within stormwater runoff areas should only be species adapted to heavy to moderate irrigation, such as riparian species.</p>
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	No policy

	Existing Program
American River Parkway Plan	No policy
North Natomas Development Guidelines	No policy
Zoning Code	No policy
Building Code	No policy

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)

<p>General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)</p>	<p>Existing Program</p> <p><u>OVERALL URBAN GROWTH POLICY STATEMENTS</u></p> <p>Policy 10 – Open Space and Natural Resource Conservation It is the policy of the City to conserve and protect natural resources and planned open space areas, and to phase the conservation of agricultural lands to planned urban uses. Page 1-35</p> <ul style="list-style-type: none"> ▪ The City will continue to provide open space for the preservation and conservation of natural resources. The City will continue programs established by the Department of Parks and Community Services in maintaining parks, trees, and other landscaping. The City will conserve riparian forests and grassland vegetation. The City will protect planned open space areas that support wildlife habitat and work with the County in protecting unique physical features. The City will establish development standards to enhance the visual amenities of open space areas. ▪ The City will provide open space for, and the conservation of the managed production of resources as defined in the Conservation and Open Space Element. The City will work with the County to study an agricultural preservation program. The City will allow the extraction of construction grade aggregate and assure that depleted aggregate pits are reclaimed for appropriate uses. ▪ The City will provide open space for recreation. The American and Sacramento River Parkways will be conserved and protected. The city has other open space areas that can also be developed to their recreational use potential. These areas include utility easement, floodways and flood plains. <p><u>Section 6 Conservation and Open Space Element</u></p> <p>PRESERVATION OF NATURAL RESOURCES Goal A: Implement <u>the Master Plan for Park Facilities and Recreation Services. Page 6-12</u> <u>Policy 1</u> - Continue programs for the planting and maintenance of trees, grass, floral displays and other public landscapes both in the parks and on other City land such as street medians, public buildings and grounds. <u>Policy 2</u> - Continue to implement the Heritage Tree program. <u>Policy 3</u> - Continue to assist the efforts of the County and the Sacramento Tree Foundation in identifying, acquiring, and creating appropriate locations for urban forests and greenbelt.</p> <p><u>Goal B:</u> Retain the riparian woodlands and grassland vegetation along the waterways and floodways in North Natomas and South Sacramento insofar as possible. Page 6-13 <u>Policy 1</u> - Protect the wooded areas along the waterways and drainage canals insofar as possible. <u>Policy 2</u> - Explore ways to conserve a modified floodplain environment along Laguna Creek in South Sacramento to the extent feasible.</p> <p><u>Goal C:</u> Conserve and protect the planned open space areas along the American and Sacramento Rivers, floodways and undevelopable floodplains to the extent feasible. Page 6-13 <u>Policy 1</u> - Retain the habitat areas where known endangered wildlife exists to the extent feasible.</p>
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	<p>Existing Program</p> <p>Goal D: Work with the County of Sacramento to identify, protect and enhance physical features and settings that are unique to the area to the maximum extent feasible. Page 6-14 <u>Policy 1</u> - Conserve vernal pools with rear and endangered species to whatever extent feasible.</p> <p>Goal E: Establish development standards for water related open space lands throughout the City to enhance the visual amenities of these uses. Page 6-14 <u>Policy 1</u> -Explore ways to reverse degradation and pollution and enhance the beauty and wildlife habitats of creeks and drainage canals. <u>Policy 2</u> - Explore ways to preserve the undeveloped open space areas and wildlife habitats along Dry Creek, Arcade Creek, Magpie Creek, Fisherman’s Lake, the area south of Woodlake Park, Morrison Creek, Elder Creek, Laguna Creek, Beach Lake and drainage canals. <u>Policy 3</u> - Design new floodways to be built in North Natomas and South Sacramento, to be aesthetically pleasing and offer limited passive recreation as well as wildlife sanctuaries.</p> <p>CONSERVATION OF, AND OPEN SPACE USED FOR THE MANAGED PRODUCTION OF RESOURCES</p> <p>Goal A: Retain land inside the City for agricultural use until the need arises for development, and support actions of Sacramento County to similarly conserve its land until needed for urban growth. Page 6-15 <u>Policy 1</u> - Phase the conversion of agricultural lands to urban uses while implementing the policies of the North Natomas Community Plan. <u>Policy 2</u> - Work with Sacramento County to explore the feasibility of an agricultural preservation plan.</p> <p><u>Section 6 Conservation and Open Space Element</u></p> <p>OUTDOOR RECREATION</p> <p>Goal A: Conserve and protect the Sacramento and American Rivers, their shorelines and parkways. Page 6-16 <u>Policy 2</u> - Implement the goals and policies of the Sacramento River Parkway Plan, and amend the Plan to include updated information and recommendations form the Sacramento River Marina Carrying Capacity Study. Policy 4 - Work with the State to develop additional use of its open space areas at Cal Expo in a manner consistent with the American River Parkway Plan.</p>
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	No policy
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	No policy
South Sacramento	“Establish an urban creeks policy for the City of Sacramento to reserve and enhance, wherever possible, the natural creek habitat.” p. 101
Airport Meadowview	No policy

	Existing Program
Other Plans	
65 th Street/University Transit Village Plan	No policy
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi- Family Residential Design Principles	No policy
Smart Growth Principles	IMPLEMENTATION STRATEGY - Page 1 Smart Growth Principles 2. Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin) 6. Preserve open space, farmland, natural beauty, and critical environmental areas
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	No policy
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	Chapter 3 Goals and Policies <u>Sacramento River Parkway Goals</u> - page 30 o To recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control. o To preserve, protect and enhance the natural and cultural resources of the Parkway. <u>General Policies</u> - page 31 G4 The Parkway is primarily a recreational, open space, educational, and water oriented resource. <u>Recreational Use Policies</u> - page 32 R3 Recreational activities which are hazardous or incompatible with Parkway natural habitat and uses, or detrimental to adjacent and surrounding habitat are prohibited. <u>Natural and Cultural Resource Policies</u> - page 39 N1 Although the Parkway is to be developed for human use, the natural environment shall be protected, preserved, and enhanced to the fullest extent possible, especially large aggregations of riparian vegetation and wildlife. N2 Public access in Nature Study Areas may be limited if access negatively affects a habitat restoration project or a listed threatened or endangered species. N3 Development within the Parkway, including trails and roads, signs, and structures, shall be designed to minimize impact to native vegetation. N4 Areas designated for habitat restoration shall be planted with native or indigenous species. N8 Endangered or threatened species and their habitat shall be protected from encroachment by designating the area as Riparian Habitat Preserve or nature Study.

<p>American River Parkway Plan</p>	<p>Existing Program</p> <p>Chapter 2 Goals and Policies</p> <p>GOALS - page 2-1</p> <ul style="list-style-type: none"> o To provide, protect and enhance for public use a continuous open space greenbelt along the American River extending from the Sacramento River to Folsom Dam; and o To preserve, protect, interpret and improve the natural, archaeological, historical and recreational resources of the Parkway, including and adequate flow of high quality water, anadromous and resident fishes, migratory and resident wildlife, and diverse natural vegetation; <p>POLICIES - page 2-1</p> <p><u>1.0 Parkway Concept</u></p> <p>1.1 The American River Parkway is a unique regional feature which shall be managed to balance the goal of preserving naturalistic open space and environmental quality within the urban environment, with plans to provide recreational opportunity in the Sacramento area.</p> <p><u>2.0 Resources of the Parkway - page 2-2</u></p> <p>2.1 Any development within the Parkway, including buildings, roads, parking lots and turfed areas, shall be designed and located such that any impact upon native vegetation is minimized, and appropriate mitigation measures are incorporated into the project.</p> <p>2.2 Phased plans with short and long-term measures for the enhancement of native vegetation and the elimination of undesirable nonnative vegetation shall be developed and implemented.</p> <p>2.6 Where appropriate, areas which have been damaged by mining, flooding, or other adverse conditions should be reclaimed for recreational use consistent with this Plan or restored to a naturalistic condition, as determined by the designated land use category.</p> <p><u>3.0 Water Flows, Water Quality and Flood Control - page 2-3</u></p> <p>3.1 Water flow in the Lower America River should be maintained at adequate levels to permanently sustain the integrity of the water quality, fisheries, waterway recreation, aesthetics, riparian vegetation, wildlife, and other river-dependent features and activities of the Parkway. The required flow levels of the Lower American River should be established at higher levels than those required under Decision 1400 of the State Water Resources Control Board. State and Federal Policy should provide for the maintenance of flows in the optimum range in the Lower American River.</p>
<p>North Natomas Development Guidelines</p>	<p>OVERVIEW - page 3</p> <ul style="list-style-type: none"> o Preserve the natural environment to the benefits of the residents and the existing plant and animal species. <p>PUBLIC OPEN SPACE, PARKS, URBAN FOREST AND WATERWAYS page 11</p> <p><u>Open Space Opportunities:</u> Establish a hierarchy of public and private open space opportunities including: Regional Park, Community Parks, Neighborhood Parks, Pocket parks, Parkway with drainage, ped/bike trails, roadway, and utility corridors, village greens and squares, community gardens, agricultural buffers and open space corridors, tot-lots and playgrounds, plazas and courtyards, landscape features – entryways, gateways and medians, Witter Ranch Historic Farm. Open space opportunities should be designed to provide public view site lines; connections between other open space areas; . . .</p> <p><u>Parks:</u> Public parks serves as neighborhood and community “anchors”. . . . Allow for topographic variations within the ark and design for storm water detention.</p>

	<p>Existing Program</p> <p><u>Urban Forest:</u> Public and private open space areas shall meet the following urban forest guidelines:</p> <ol style="list-style-type: none"> 1. Design landscaping around infrastructure and buildings to maximize energy conservation and human comfort. 3. Promote biodiversity and pollution stability. 4. Minimize irrigation required through appropriate species selection, landscape and irrigation design, reclamation of water runoff, and education. <p>Urban/Agriculture Buffer: Using the urban forest guidelines specified above, property owners adjacent to the urban/agriculture buffer along the west and north sides of the community plan area should cooperatively design a buffer of trees and other species to demarcate the urban edge from the agricultural uses, including the Witter Ranch Historic Farm. Incorporate drought tolerant and other native plants to reduce maintenance costs, conserve water, and encourage native wildlife species to frequent the area.</p> <p>Freeway Landscaped Buffer: Using the urban forest guidelines specified above, the property owners along the Interstate 5 and Interstate 80 freeway corridors should design and plant, where not yet planted, a landscaped buffer that reduces the impacts of the freeway from the adjacent uses and allows motorists along the freeway to view special landmarks within the North Natomas Community.</p> <p>Habitat Opportunities: Define a hierarchy of habitat opportunities throughout the community including: drainage corridors, detention basins, utility corridors, natural areas within developed parks, Fisherman’s Lake, Witter Ranch Historic Farm, and the swale, as well as the ag/urban and freeway buffer areas. Each developer is required to participate in the Habitat Conservation Plan, once adopted, to provide on- or off-site habitat value land for plant and animal species.</p> <p><u>Waterways</u></p> <p>Drainage Canals and Basins: Drainage rights-of-way are encouraged to accommodate the following multiple uses as well as serve as stormwater drainage facilities: habitat value land, open space opportunities, parks, bikeways/walkways, community gardens, and urban forest.</p> <p>The perimeters of the drainage canals and basin should be used as pedestrian bicyclist connections. Landscaping should be designed for shade, as a view screen, to frame landmarks, and to buffer urban uses from agricultural uses, as well as withstand likely inundation of stormwater.</p>
Zoning Code	No policy
Building Code	No policy

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

<p>General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)</p>	<p>Existing Program</p> <p><u>OVERALL URBAN GROWTH POLICY STATEMENTS</u></p> <p>Policy 10 – Open Space and Natural Resource Conservation It is the policy of the City to conserve and protect natural resources and planned open space areas, and to phase the conservation of agricultural lands to planned urban uses. Page 1-35</p> <ul style="list-style-type: none"> ▪ The City will continue to provide open space for the preservation and conservation of natural resources. The City will continue programs established by the Department of Parks and Community Services in maintaining parks, trees, and other landscaping. The City will conserve riparian forests and grassland vegetation. The City will protect planned open space areas that support wildlife habitat and work with the County in protecting unique physical features. The City will establish development standards to enhance the visual amenities of open space areas. ▪ The City will provide open space for recreation. The American and Sacramento River Parkways will be conserved and protected. The city has other open space areas that can also be developed to their recreational use potential. These areas include utility easement, floodways and flood plains. <p><u>Section 6 Conservation and Open Space Element</u> <u>PRESERVATION OF NATURAL RESOURCES</u></p> <p><u>Goal B:</u> Retain the riparian woodlands and grassland vegetation along the waterways and floodways in North Natomas and South Sacramento insofar as possible. Page 6-13 <u>Policy 1</u> - Protect the wooded areas along the waterways and drainage canals insofar as possible. <u>Policy 2</u> -Explore ways to conserve a modified floodplain environment along Laguna Creek in South Sacramento to the extent feasible.</p> <p><u>Goal C:</u> Conserve and protect the planned open space areas along the American and Sacramento Rivers, floodways and undevelopable floodplains to the extent feasible. Page 6-13 <u>Policy 1</u> - Retain the habitat areas where known endangered wildlife exists to the extent feasible.</p> <p><u>Goal D:</u> Work with the County of Sacramento to identify, protect and enhance physical features and settings that are unique to the area to the maximum extent feasible. Page 6-14 <u>Policy 1</u> - Conserve vernal pools with rear and endangered species to whatever extent feasible.</p> <p><u>Goal E:</u> Establish development standards for water related open space lands throughout the City to enhance the visual amenities of these uses. Page 6-14 <u>Policy 1</u> - Explore ways to reverse degradation and pollution and enhance the beauty and wildlife habitats of creeks and drainage canals. <u>Policy 2</u> - Explore ways to preserve the undeveloped open space areas and wildlife habitats along Dry Creek, Arcade Creek, Magpie Creek, Fisherman’s Lake, the area south of Woodlake Park, Morrison Creek, Elder Creek, Laguna Creek, Beach Lake and drainage canals.</p> <p><u>OUTDOOR RECREATION</u></p> <p><u>Goal A:</u> Conserve and protect the Sacramento and American Rivers, their shorelines and parkways. Page 6-16</p>
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	Existing Program
	<u>Policy 2</u> - Implement the goals and policies of the Sacramento River Parkway Plan, and amend the Plan to include updated information and recommendations from the <u>Sacramento River Marina Carrying Capacity Study</u> .
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	<p>Utilities</p> <p>Storm Drainage - Page 40 OBJECTIVE 1: Provide a storm drainage system that achieves water quality objectives for the Sacramento and American Rivers, and that relieves pressure on the existing combined system in the downtown area.</p> <p><u>POLICY 1.5:</u> Design the storm drainage system to meet all City/National Pollutant Discharge Elimination System (NPDES) and water quality requirements. <u>POLICY 1.7:</u> Upgrade all existing storm drainage facilities in the Richards Boulevard area to meet current City standards.</p>
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	<p>“All drainage flows from the NNCP will be discharged to the Sacramento River.” p. 69 “Storm drainage water velocities in open channels should not exceed 2 feet per second.” p. 69</p>
South Sacramento	“Encourage effective flood control programs that are also sensitive to the natural creek environment.” p. 76
Airport Meadowview	No policy
Other Plans	
65 th Street/University Transit Village Plan	No policy
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi-Family Residential Design Principles	No policy
Smart Growth Principles	No policy
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	No policy
Central City Neighborhood Design Guidelines	No policy

	Existing Program
Sacramento River Parkway Plan	<p>Chapter 3 Goals and Policies</p> <p><u>Recreational Use Policies</u> - page 32</p> <p>R4 All recreational development including trails, signs, structures and fences shall be constructed to prevent erosion, protect the structural integrity of the levee, and blend harmoniously with the surrounding landscape.</p> <p><u>Natural and Cultural Resource Policies</u> - page 39</p> <p>N3 Development within the Parkway, including trails and roads, signs, and structures, shall be designed to minimize impact to native vegetation.</p>
American River Parkway Plan	<p>Chapter 2 Goals and Policies</p> <p>GOALS - page 2-1</p> <ul style="list-style-type: none"> o To provide, protect and enhance for public use a continuous open space greenbelt along the American River extending from the Sacramento River to Folsom Dam; and <p>POLICIES - page 2-1</p> <p><u>2.0 Resources of the Parkway</u> page 2-2</p> <p>2.1 Any development within the Parkway, including buildings, roads, parking lots and turfed areas, shall be designed and located such that any impact upon native vegetation is minimized, and appropriate mitigation measures are incorporated into the project.</p>
North Natomas Development Guidelines	<p>Habitat Opportunities: Define a hierarchy of habitat opportunities throughout the community including: drainage corridors, detention basins, utility corridors, natural areas within developed parks, Fisherman’s Lake, Witter Ranch Historic Farm, and the swale, as well as the ag/urban and freeway buffer areas. Each developer is required to participate in the Habitat Conservation Plan, once adopted, to provide on- or off-site habitat value land for plant and animal species.</p> <p><u>Waterways</u></p> <p>Drainage Canals and Basins: Drainage rights-of-way are encouraged to accommodate the following multiple uses as well as serve as stormwater drainage facilities: habitat value land, open space opportunities, parks, bikeways/walkways, community gardens, and urban forest.</p> <p>The perimeters of the drainage canals and basin should be used as pedestrian bicyclist connections. Landscaping should be designed for shade, as a view screen, to frame landmarks, and to buffer urban uses from agricultural uses, as well as withstand likely inundation of stormwater.</p>
Zoning Code	No policy
Building Code	No policy

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	No policy.
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	No policy
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	Meet all National Pollution Discharge Elimination System (NPDES) and other regulatory permit requirements. Page 69
South Sacramento	No policy
Airport Meadowview	No policy
Other Plans	
65 th Street/University Transit Village Plan	GOALS AND POLICIES C3. CIRCULATION/INFRASTRUCTURE Utilities -Page 28 Goal 26: Ensure a balanced approach to resolving drainage and sewer issues through the transit village area. <u>26.1</u> The Utilities Department will work with project applicants in the 65 th Street/University Transit Village are to identify cost effective storm drainage and sewer improvements and operations practices that will reduce impacts to the existing system and require minimal expansion or modification existing infrastructure.
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi- Family Residential Design Principles	No policy
Smart Growth Principles	No policy
Parking Lot Tree Shading Ordinance Design and	No policy

	Existing Program
Maintenance Guidelines	
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	No policy
American River Parkway Plan	No policy
North Natomas Development Guidelines	No policy
Zoning Code	No policy
Building Code	No policy

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p><u>Section 7: Public Facilities and Services Element</u></p> <p>GOALS AND POLICIES FOR DRAINAGE <u>Goal A:</u> Provide adequate drainage facilities and services to accommodate desired growth levels. Page 7-9 <u>Policy 2</u> - Coordinate efforts with County Public Works Department and other agencies as appropriate to provide adequate and efficient drainage facilities and connector lines to service the Rio Linda, North Natomas and Laguna Creek areas of the City.</p> <p><u>Section 8: Health and Safety Element</u> CREEK AND FLOOD PLAINS GOALS AND POLICIES FOR FLOOD HAZARDS <u>Goal A:</u> Protect against flood related hazards wherever feasible. Page 8-18 Policy 1 - Prohibit development of areas subject to unreasonable risk of flooding unless measures can be implemented to eliminate or reduce the risk of flooding.</p>
Master/Community Plans	
Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan	No policy
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	No policy
South Sacramento	No policy
Airport Meadowview	No policy
Other Plans	
65 th Street/University Transit Village Plan	No policy
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi- Family Residential	No policy

	Existing Program (<i>note conflicts, if any</i>)*
Design Principles	
Smart Growth Principles	No policy
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	No policy
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	<p>Chapter 3 Goals and Policies</p> <p><u>Recreational Use Policies</u> - page 32</p> <p>R4 All recreational development including trails, signs, structures and fences shall be constructed to prevent erosion, protect the structural integrity of the levee, and blend harmoniously with the surrounding landscape.</p> <p><u>Erosion Policies</u> - page 39</p> <p>E1 Reduce indiscriminate foot and bicycle traffic on levee slopes by providing trails, fencing, and signage to channel traffic to key points.</p> <p>E2 Avoid use of soil sterilents or herbicides over large areas as this would encourage surface erosion.</p> <p>E3 Indigenous grasses and other native vegetation should be used stabilize the soil and reduce rain water runoff.</p>
American River Parkway Plan	No policy
North Natomas Development Guidelines	No policy
Zoning Code	No policy
Building Code	No policy

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

<p>General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)</p>	<p>Existing Program</p> <p><u>OVERALL URBAN GROWTH POLICY STATEMENTS</u></p> <p><u>Policy 4 – New Growth Areas</u> It is the policy of the City to approve development in the City’s new growth areas that promotes efficient growth patterns and public service extensions, and is compatible with adjacent developments. Page 1-32</p> <ul style="list-style-type: none"> ▪ New growth area development will be allowed when all necessary infrastructure is available or will be provided. If it is consistent with the City’s urban growth and annexation policies, and promotes orderly and efficient growth. <p><u>Section 7: Public Facilities and Services Element</u></p> <p><u>OVERALL GOALS</u></p> <p><u>Goal A:</u> Provide and maintain a high quality of public facilities and services to all of the City. Page 7-1</p> <p><u>GOALS AND POLICIES FOR DRAINAGE</u></p> <p><u>Goal A:</u> Provide adequate drainage facilities and services to accommodate desired growth levels. Page 7-9</p> <p><u>Policy 1</u> - Ensure that all drainage facilities are adequately sized and constructed to accommodate the projected increase in stormwater runoff from urbanization.</p> <p><u>Policy 2</u> - Coordinate efforts with County Public Works Department and other agencies as appropriate to provide adequate and efficient drainage facilities and connector lines to service the Rio Linda, North Natomas and Laguna Creek areas of the City.</p>
<p>Master/Community Plans</p>	
<p>Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan</p>	<p>Utilities</p> <p>Storm Drainage - Page 40</p> <p>OBJECTIVE 1: Provide a storm drainage system that achieves water quality objectives for the Sacramento and American Rivers, and that relieves pressure on the existing combined system in the downtown area.</p> <p><u>POLICY 1.1:</u> Provide for the separation of combined sewer flows in the Railyards planning area.</p> <p><u>POLICY 1.5:</u> Design the storm drainage system to meet all City/National Pollutant Discharge Elimination System (NPDES) and water quality requirements.</p> <p><u>POLICY 1.7:</u> Upgrade all existing storm drainage facilities in the Richards Boulevard area to meet current City standards.</p>
<p>North Sacramento</p>	<p>No policy</p>
<p>Pocket Area</p>	<p>No policy</p>
<p>Central City</p>	<p>No policy</p>
<p>South Natomas</p>	<p>No policy</p>
<p>North Natomas</p>	<p>“Meet all National Pollution Discharge Elimination System (NPDES) and other regulatory permit requirements.” p. 69</p>
<p>South Sacramento</p>	<p>No policy</p>
<p>Airport Meadowview</p>	<p>No policy</p>

	Existing Program
Other Plans	
65 th Street/University Transit Village Plan	<p>GOALS AND POLICIES</p> <p>C2. SITE AND BUILDING DESIGN New Site and Building Design - Page 16 Goal 12: Promote energy efficient design and resource conservation within the district 12.3 Where feasible, new development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p> <p>C3. CIRCULATION/INFRASTRUCTURE Utilities - Page 28 Goal 26: Ensure a balanced approach to resolving drainage and sewer issues through the transit village area. 26.1 The Utilities Department will work with project applicants in the 65th Street/University Transit Village area to identify cost effective storm drainage and sewer improvements and operations practices that will reduce impacts to the existing system and require minimal expansion or modification existing infrastructure. <u>26.2</u> In order to reduce impacts to existing and planned storm water and sewer drain system, new development will have a minimum target level of site perviousness of 10% (note: on site design improvements (e.g., parking lots as detention) off site improvements or fees may be required in lieu of this requirement). Site design mitigation measures, subject to the approval of the Utilities Director, may include: Barrier retention (berm, wall, planter, etc.), Depression storage (lawn, garden, parking lot, pond, athletic field, etc.), Land leveling, Terracing, Porous pavement, Driveway or parking lot under drain, shallow percolation (leach field), deep percolation (well), above-grade storage (rooftop, water tower), sub-grade storage (tank, rock layer), soil modification, re-vegetation (floor, canopy), structure on piers. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Storm Management Program in order to reduce pollutants in urban runoff to the maximum extent possible. Goal 27: Reduce urban runoff. Page 28 <u>27.1</u> New development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p>
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential Design Principles	No policy
Multi-Family Residential Design Principles	<p>RESIDENTIAL DESIGN ELEMENT:</p> <p>DRAINAGE/WATER QUALITY Principle: New multi-family development shall incorporate design features, which provide for on-site source and treatment of urban runoff. Page 21</p>

	<p>Existing Program</p> <p><u>Parking Lots</u></p> <ul style="list-style-type: none"> o With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. o Parking lots, which are part of new developments with 1 acre or more impervious area, are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and /or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground. o Integrating treatment measures with areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit A and Exhibit B) describe typical criteria for Vegetated Swales and filter strips, which can effectively be integrated with tree shading. The Department of Utilities, Stormwater Management Program should be contacted for specific design and plan approval. <p><u>Waste Handling Areas</u></p> <ul style="list-style-type: none"> o Provide covered trash and recycling containers in common areas such as recreation, laundry and vehicle wash areas. o Provide grades or slopes of paved areas which direct runoff towards a dead-end sump or a drain connected to the sanitary sewer. o Do not locate a storm drain in the immediate vicinity of a waste handling area. <p><u>Vehicle Wash Areas</u></p> <ul style="list-style-type: none"> o Provide common vehicle wash areas where feasible. o Pave, berm and grade designated vehicle wash areas to drain into the sanitary sewer. <p>Note: New multi-family sites shall be designed to incorporate urban runoff mitigation measures as identified in the City of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures.</p> <p>ENERGY CONSERVATION Principle: New multi-family development shall incorporate site planning and building design features that help to reduce energy consumption. Page 28</p> <p><u>Energy Conservation</u> The following measures should be included in building design and site planning: Incorporate features that reduce water consumption (i.e., low flow fixtures, recycled grey water, etc.)</p>
Smart Growth Principles	<p>IMPLEMENTATION STRATEGY Smart Growth Principles - Page 1 2. Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin)</p>
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	<p>IV. DRAINAGE / WATER QUALITY OPTIONS: Page 10 With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Stormwater Management Program in order to reduce pollutants in urban runoff to the maximum extent practicable.</p> <p>Parking lots which are part of new developments with one (1) acre or more of impervious area are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and/or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground.</p>

	Existing Program
	<p>Integrating treatment control measures within areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit D and Exhibit E) describe criteria for vegetated swales and filter strips, which can be integrated effectively with tree shading. The Department of Utilities' Stormwater Management Program should be referred to for specific design criteria. Contact the Department of Utilities for plan approval requirements related to stormwater treatment control measures.</p> <p>Trees planted within stormwater runoff areas should only be species adapted to heavy to moderate irrigation, such as riparian species.</p>
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	<p>Chapter 3 Goals and Policies <u>Erosion Policies</u> - page 39 E2 Avoid use of soil sterilents or herbicides over large areas as this would encourage surface erosion.</p>
American River Parkway Plan	<p>Chapter 2 Goals and Policies <u>3.0 Water Flows, Water Quality and Flood Control</u> - page 2-3 3.3 Discharge or drainage of pollutants into the Lower American River shall be eliminated. 3.4 Levee protection and slope stabilization methods within the Parkway shall only be used when the Board of Supervisors determine that there is a demonstrated need to protect the health, safety and welfare of the community. The use of these methods shall result in minimal damage to riparian vegetation and wildlife.</p>
North Natomas Development Guidelines	No policy
Zoning Code	No policy
Building Code	No policy

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

<p>General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)</p>	<p>Existing Program</p> <p><u>OVERALL URBAN GROWTH POLICY STATEMENTS</u></p> <p><u>Policy 4 – New Growth Areas</u> It is the policy of the City to approve development in the City’s new growth areas that promotes efficient growth patterns and public service extensions, and is compatible with adjacent developments. Page 1-32</p> <p>New growth area development will be allowed when all necessary infrastructure is available or will be provided. If it is consistent with the City’s urban growth and annexation policies, and promotes orderly and efficient growth.</p> <p><u>Section 6 Conservation and Open Space Element</u> <u>PRESERVATION OF NATURAL RESOURCES</u> <u>Goal E:</u> Establish development standards for water related open space lands throughout the City to enhance the visual amenities of these uses. Page 6-14 <u>Policy 3</u> - Design new floodways to be built in North Natomas and South Sacramento, to be aesthetically pleasing and offer limited passive recreation as well as wildlife sanctuaries.</p> <p><u>Section 7: Public Facilities and Services Element</u> <u>OVERALL GOALS</u> <u>Goal A:</u> Provide and maintain a high quality of public facilities and services to all of the City. Page 7-1</p> <p><u>GOALS AND POLICIES FOR DRAINAGE</u> <u>Goal A:</u> Provide adequate drainage facilities and services to accommodate desired growth levels. Page 7-9 <u>Policy 1</u> - Ensure that all drainage facilities are adequately sized and constructed to accommodate the projected increase in stormwater runoff from urbanization. <u>Policy 2</u> - Coordinate efforts with County Public Works Department and other agencies as appropriate to provide adequate and efficient drainage facilities and connector lines to service the Rio Linda, North Natomas and Laguna Creek areas of the City.</p> <p><u>Section 8: Health and Safety Element</u></p> <p><u>CREEK AND FLOOD PLAINS</u> <u>GOALS AND POLICIES FOR FLOOD HAZARDS</u> <u>Goal A:</u> Protect against flood related hazards wherever feasible. Page 8-18</p>
<p>Master/Community Plans</p> <p>Facility Element of the Railyards Specific Plan and the Richards Boulevard</p>	<p><u>Utilities</u></p> <p><u>Storm Drainage</u> - Page 40</p>

	Existing Program
Area Plan	<p>OBJECTIVE 1: Provide a storm drainage system that achieves water quality objectives for the Sacramento and American Rivers, and that relieves pressure on the existing combined system in the downtown area.</p> <p>POLICY 1.1: Provide for the separation of combined sewer flows in the Railyards planning area.</p> <p>POLICY 1.5: Design the storm drainage system to meet all City/National Pollutant Discharge Elimination System (NPDES) and water quality requirements.</p> <p>POLICY 1.7: Upgrade all existing storm drainage facilities in the Richards Boulevard area to meet current City standards.</p>
North Sacramento	No policy
Pocket Area	No policy
Central City	No policy
South Natomas	No policy
North Natomas	“Meet all National Pollution Discharge Elimination System (NPDES) and other regulatory permit requirements.” p. 69
South Sacramento	No policy
Airport Meadowview	No policy
	Other Plans
65 th Street/University Transit Village Plan	<p>GOALS AND POLICIES</p> <p>C3. CIRCULATION/INFRASTRUCTURE</p> <p>Utilities - Page 28</p> <p>Goal 26: Ensure a balanced approach to resolving drainage and sewer issues through the transit village area.</p> <p>26.1 The Utilities Department will work with project applicants in the 65th Street/University Transit Village area to identify cost effective storm drainage and sewer improvements and operations practices that will reduce impacts to the existing system and require minimal expansion or modification existing infrastructure.</p> <p>26.2 In order to reduce impacts to existing and planned storm water and sewer drain system, new development will have a minimum target level of site perviousness of 10% (note: on site design improvements (e.g., parking lots as detention) off site improvements or fees may be required in lieu of this requirement). Site design mitigation measures, subject to the approval of the Utilities Director, may include: Barrier retention (berm, wall, planter, etc.), Depression storage (lawn, garden, parking lot, pond, athletic field, etc.), Land leveling, Terracing, Porous pavement, Driveway or parking lot under drain, shallow percolation (leach field), deep percolation (well), above-grade storage (rooftop, water tower), sub-grade storage (tank, rock layer), soil modification, re-vegetation (floor, canopy), structure on piers.</p> <p>In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Storm Management Program in order to reduce pollutants in urban runoff to the maximum extent possible.</p> <p>Goal 27: Reduce urban runoff. Page 28</p> <p>27.1 New development shall incorporate design features, which provide for on-site source and treatment of urban water runoff.</p>
R Street Corridor	No policy
Citywide Residential Design Standards	No policy
Single-Family Residential	No policy

Design Principles	Existing Program
Multi- Family Residential Design Principles	<p>Residential Design Element:</p> <p>Drainage/Water Quality Principle: New multi-family development shall incorporate design features, which provide for on-site source and treatment of urban runoff. Page 21</p> <p><u>Parking Lots</u></p> <ul style="list-style-type: none"> o With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. o Parking lots, which are part of new developments with 1 acre or more impervious area, are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and /or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground. o Integrating treatment measures with areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit A and Exhibit B) describe typical criteria for Vegetated Swales and filter strips, which can effectively be integrated with tree shading. The Department of Utilities, Stormwater Management Program should be contacted for specific design and plan approval. <p><u>Waste Handling Areas</u></p> <ul style="list-style-type: none"> o Provide covered trash and recycling containers in common areas such as recreation, laundry and vehicle wash areas. o Provide grades or slopes of paved areas which direct runoff towards a dead-end sump or a drain connected to the sanitary sewer. o Do not locate a storm drain in the immediate vicinity of a waste handling area. <p><u>Vehicle Wash Areas</u></p> <ul style="list-style-type: none"> o Provide common vehicle wash areas where feasible. o Pave, berm and grade designated vehicle wash areas to drain into the sanitary sewer. <p>Note: New multi-family sites shall be designed to incorporate urban runoff mitigation measures as identified in the City of Sacramento Guidance Manual for On-Site Stormwater Quality Control Measures.</p>
Smart Growth Principles	<p><u>IMPLEMENTATION STRATEGY</u> Smart Growth Principles Page 1 2. Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin)</p>
Parking Lot Tree Shading Ordinance Design and Maintenance Guidelines	<p>PARKING LOT TREE SHADING DESIGN AND MAINTENANCE GUIDELINES</p> <p>IV. DRAINAGE / WATER QUALITY OPTIONS - Page 10 With early planning and design it is possible for areas required for tree planting to also be used to satisfy the City’s requirement to provide on-site treatment of stormwater. In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Stormwater Management Program in order to reduce pollutants in urban runoff to the maximum extent practicable.</p>

	<p>Existing Program</p> <p>Parking lots which are part of new developments with one (1) acre or more of impervious area are generally required to provide treatment control measures that capture and treat stormwater runoff through settling, filtration, and/or biodegradation. The treated runoff is then released to the storm drain system or percolated into the ground.</p> <p>Integrating treatment control measures within areas used for tree shading may significantly reduce land requirements and costs. The following figures (Exhibit D and Exhibit E) describe criteria for vegetated swales and filter strips, which can be integrated effectively with tree shading. The Department of Utilities’ Stormwater Management Program should be referred to for specific design criteria. Contact the Department of Utilities for plan approval requirements related to stormwater treatment control measures.</p> <p>Trees planted within stormwater runoff areas should only be species adapted to heavy to moderate irrigation, such as riparian species.</p>
Central City Neighborhood Design Guidelines	No policy
Sacramento River Parkway Plan	<p>Chapter 3 Goals and Policies</p> <p><u>Erosion Policies</u> - page 39</p> <p>E3 Indigenous grasses and other native vegetation should be used stabilize the soil and reduce rain water runoff.</p>
American River Parkway Plan	No policy
North Natomas Development Guidelines	<p>PUBLIC OPEN SPACE, PARKS, URBAN FOREST AND WATERWAYS - page 11</p> <p><u>Parks:</u> Public parks serve as neighborhood and community “anchors”. . . . Allow for topographic variations within the park and design for storm water detention.</p> <p>Habitat Opportunities: Define a hierarchy of habitat opportunities throughout the community including: drainage corridors, detention basins, utility corridors, natural areas within developed parks, Fisherman’s Lake, Witter Ranch Historic Farm, and the swale, as well as the ag/urban and freeway buffer areas. Each developer is required to participate in the Habitat Conservation Plan, once adopted, to provide on- or off-site habitat value land for plant and animal species.</p> <p><u>Waterways</u></p> <p>Drainage Canals and Basins: Drainage rights-of-way are encouraged to accommodate the following multiple uses as well as serve as stormwater drainage facilities: habitat value land, open space opportunities, parks, bikeways/walkways, community gardens, and urban forest.</p> <p>The perimeters of the drainage canals and basin should be used as pedestrian bicyclist connections. Landscaping should be designed for shade, as a view screen, to frame landmarks, and to buffer urban uses from agricultural uses, as well as withstand likely inundation of stormwater.</p> <p>Water Amenities: Accommodate active and passive recreational opportunities around water amenities – i.e., pocket parks, park courses, picnic areas.</p> <p>PUBLIC FACILITIES</p>

	Existing Program
	<u>Utilities:</u> Utilities rights-of-way are encouraged to accommodate the following multiple uses, as well as provide a corridor for utility services: passive recreational opportunities, pedestrian and bikeways, drainage system, other utilities, community gardens, and urban forest.
Zoning Code	No policy
Building Code	No policy

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection

The *Guidance Manual for On-Site Stormwater Quality Control Measures* includes three types of infiltration BMPs: basins, trenches and paving blocks. The sections describing these techniques caution that the use of the devices could cause groundwater contamination. The following limitations are also noted: 1) cannot be used in areas with high ground water levels; 2) cannot be used in high risk areas such as service/gas stations, truck stops, loading racks or heavy industrial areas (due to potential for pollutants to enter groundwater); and 3) cannot be located in areas with groundwater quality concerns.

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other

During drainage master planning, City staff computer models to predict future runoff flows and velocities as a result of new development and, if necessary, establish requirements for detention basins and other infrastructure that will mitigate the expected increases. During the development review process, the applicant is required to submit a drainage study that estimates flows and velocities. Development review staff may require the applicant to mitigate for the increases in flows and/or velocities, if necessary.

In the North Natomas area, projects are required to discharge at pre-development rates. The maximum downstream discharge shall be no more than 0.10 cfs/acre of contributing drainage area in Natomas.

Appendix D-3

City of Citrus Heights

Summary of Existing Programs for New Development

Appendix D-3: City of Citrus Heights

Water Quality/Watershed Protection Principles and Policies (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	General Language preserving and enhancing character, distinct identity, and livability of the City’s rural neighborhoods (Goal 6)
Master/Community Plans	
Zoning Code	Parking lot shading and landscaping requirements, planter area - based on parking spaces.
Building Code	Not addressed.
Other	

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Section I of Conservation Element addresses Surface Water Quality. CO-9 states that “Community and specific plans shall specify urban runoff control strategies and requirements, consistent with Master Drainage Plans and Public Work’s urban runoff management program , for development in newly urbanizing areas and identify sites where retention and treatment are warranted consistent with discharge permit requirement and county-wide runoff measures.” CO-9-12 address water quality. CO-13-15 require for the minimizing of erosion by landscaping and design during and after construction
Master/Community Plans	As required in General Plan language, drainage master plans are required to contain a plan for treating stormwater runoff. Standard language is required to be included with these plans.
Zoning Code	Zoning code has no language requiring stormwater quality controls.
Building Code	16A.42.090 Permits Not Required (Grading) “... less than 350 cubic yards Also, section 16A.52.100 Exemptions
Improvement Standards	Include revised tables in Improvement Standards or refer to Storm Water Quality Guidance Manual.
County Code (Stormwater Quality Ordinance)	Language is not sufficient to allow County to require SWQ treatment – conditioning mechanism is during CEQA/Planning processes.
Title 22	Land Development Guidelines

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	GOAL 17: Develop the Stock Ranch property with a mix of uses that enhance the City’s economic base, are compatible with surrounding land uses, and are sensitive to natural resources
Master/Community Plans	
Zoning Code	Article 4: NS – Natural Streams Overlay Zone 235-40: Purpose
Guidance Manual for Design of Multi-functional Drainage Corridors	Guidance manual prepared by County to establish standards for design of channels in order to provide improved water quality, habitat, etc.
Improvement Standards	Standard trapezoidal channel design language. Recent change, concrete channels are only allowed if approved by the City Engineer

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Goal 35: Preserve, protect and enhance natural habitat areas, including creek and riparian corridors, oak woodlands, and wetlands
Master/Community Plans	No language
Zoning Code	Guidelines for placement of structures in floodplain areas & floodway areas
Building Code	16A.52.190 Application Review (Grading)
Other	
Improvement Standards	No language disallowing open bottom culverts

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	
Master/Community Plans	A master drainage study is being prepared this year
Zoning Code	No language.
Building Code	
Other	

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Goal 37: Preserve, protect and increase plantings of trees within the City
Master/Community Plans	No language.
Zoning Code	
Building Code	16A.52.190 Application Review (Grading)
Erosion Control Ordinance	No language regarding development in erosion prone areas.

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	GOAL 14: Strengthen the retail base to ensure the City’s fiscal stability, provide needed goods and services, and promote the vitality of City commercial districts and nodes
Master/Community Plans	As stated previously, SA-5 outlines the requirements for master drainage plans, and water quality facility locations are included on this list. Does not include requirements for on-site measures.
Zoning Code	No language.
Building Code	
Improvement Standards	Improvement Standards currently include decision matrix from the Guidance Manual which requires on-site and regional stormwater treatment measures depending on land use, project size, etc.
CEQA	Current conditional language requires stormwater quality facilities if applicable.

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	No language addressing discharge rates and velocities.
Master/Community Plans	Drainage master plans currently address peak discharge rates for flood control purposes. Velocities are not addressed. Since Sacramento County is relatively flat, velocities are not typically a problem.
Zoning Code	No language.
Building Code	
Improvement Standards	Improvement Standards specify that channels will be designed to convey the 100 year flood event and minimum and maximum velocities are specified (2 f/s – 10 f/s depending on type of construction).

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection (*note conflicts, if any*)

CO-25 states that “Should the Board of Supervisors determine that there is a significant adverse effect on ground water, including effects on quality, no building permits for urban commercial and residential uses shall be issued.” Besides this, the County does not have a policy restricting the use of infiltration.

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other (*note conflicts, if any*)

At this time, the County limits discharges from new development during the master plan process primarily for the purpose of flood control.

Appendix D-4

City of Elk Grove

Summary of Existing Programs for New Development

Appendix D-4: City of Elk Grove

Water Quality/Watershed Protection Principles and Policies (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation and Air Quality Element (CAQ): CAQ-7: Consider development clustering</p> <p>CAQ-11: The City recognizes the value of streams to allow vegetation.....</p> <p>CAQ-12: Encourage the retention of natural stream corridors.....</p> <p>Public Facilities and Finance Element (PF): PF-1: Except when prohibited by state law, the City shall require that sufficient capacity in all public services.....</p> <p>Safety Element (SA): SA-18: Parcels should not be created on which the presence of easement, floodplain, marsh or riparian habitat....</p>
Master/Community Plans	No Language
Zoning Code	No Language
Building Code	Page 37, #16: City encourages limited increases in storm water runoff. Page 65, #14: Driveways restriction on impervious surfaces.
Other	<p>Design Guidelines: III., 16: The City encourages limited increases in runoff relative to development... III., B, 2., 14: Driveways should not dominate the front yard... V., A., 2., 8: The City encourages innovative designs that mitigate... V., A., 2., 17I: The City encourages the use of pervious and alternative pavements...</p>
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation and Air Quality Element (CAQ): CAQ-13: No fill in 100-year floodplain. CAQ-14: Transition zones for development near floodplains. CAQ-16: Future land uses that are anticipated...</p> <p>Public Facilities and Finance Element (PF): PF-5: City protects quality and quantity of groundwater.</p> <p>Safety Element (SA): SA-19: Construction of flood control projects. SA-21: New projects to incorporate runoff control measures. SA-22: Drainage facilities to be maintained.</p>
Master/Community Plans	No Language
Zoning Code	Title 1, Ch 10, Article 6: Special Development Permits. Title 2, Ch 35, Article 6: Special Planning Area Land Use Zone. Title 3, Ch 27, Article 1: Development Standards for Property Adjacent to Designated Tributaries.
Building Code	No Language
Other	
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Shed A & B meandering channels w/ islands (PIPOP Project.) Conservation and Air Quality Element (CAQ): CAQ-4: Trees also provide other benefits... CAQ-8-Action 1: When reviewing native or non-native vegetation... CAQ-9-Actions 1 & 2: Wetlands, vernal pools, marshland... CAQ-15: Uses in streams for recreation and agriculture. CAQ-16: Dedication of open spaces. CAQ-17: The City recognizes the value of naturally... Public Facilities and Finance Element (PF): PF-4: Use of reclaimed water for irrigation. Parks, Trails, and Open Space Element (PRO): PRO-5: Open space lands are important resources. PRO-7: Retain natural drainage course.
Master/Community Plans	No Language
Zoning Code	No Language
Building Code	Page 37, #16: City encourages limited increases in storm water runoff.
Other	Design Guidelines: V., A., 2., 2: The City encourages project design that incorporates... The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation and Air Quality (CAQ): CAQ-5: Roads shall be designed, built and landscaped... CAQ-19-Action 2: The City shall permit stream channel alignment only... CAQ-19-Action 5: Channel lowering of existing natural streams... CAQ-19-Action 6: All storm drainage improvements on natural streams... CAQ-19-Action 7: Improvements in water courses... CAQ-21: Development adjacent to a natural stream(s)...</p> <p>Safety Element (SA): SA-12: The City opposes construction of flood control... SA-20: bridges shall not increase water surface elevation of 100-year floodplain.</p>
Master/Community Plans	No Language
Zoning Code	Title II, Ch. 35, Article 9, 235-160 (c): Protect and preserve the natural character...
Building Code	No Language
Other	
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation and Air Quality Element (CAQ): CAQ-1-Action 4: Promote the use of drought-tolerant vegetation... CAQ-12-Action 3: Collect information on design, construction... CAQ-21: Stream buffer zones should generally measure...</p> <p>Public Facilities and Finance Element (PF): PF-8-Action 1: All required sewer/wastewater... PF-8-Action 2: Sewage/wastewater treatment capacity...</p>
Master/Community Plans	No Language
Zoning Code	No Language
Building Code	No Language
Other	<p>Design Guidelines: III., A., 1: Conservation of resources and minimization of waste and urban runoff... III., B., 2., 20: To the extent possible... V., A., 2., 22: Parking lot landscape. Landscaping shall be provided... V., A., 2., 22(f): Trees and landscaping installed in parking lots... V., A., 2., 32: Trash enclosures shall be enclosed pursuant to the requirements...</p>
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Conservation and Air Quality Element (CAQ): CAQ-23: Uses in stream corridors...
Master/Community Plans	No Language
Zoning Code	No Language
Building Code	No Language
Other	
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	5000 SF pavement => Device Economic Development Element (ED): ED-18-1: Sharing of engineering studies and plans on water supply... Safety Element (SA): SA-23: The City shall require all new urban development...
Master/Community Plans	No Language
Zoning Code	Title II, Ch. 35, Article 9, 235-160(e): Protect and enhance the quality of water... Title III, Ch. 25, Article 3: Specific Standards for Auto Wrecking Yards located Within Floodplains...
Building Code	No Language
Other	Design Guidelines: III., 2, 4(b): Where alternative street designs involve... V., A., 2., 20(f) Shrubs and groundcover shall be designed to enhance... V., A., 2., 22(b): At a minimum, the City's Zoning Code...
	The City of Elk Grove adopted the County's Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Conservation and Air Quality Element (CAQ): CAQ-18: Post development peak storm... Safety Element (SA): SA-13: The City shall require that all new projects... SA-24: Drainage facilities should be properly maintained...
Master/Community Plans	No Language
Zoning Code	No Language
Building Code	No Language
Other	
	The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection (*note conflicts, if any*)

The City of Elk Grove adopted the County’s Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other (*note conflicts, if any*)

Detention Basins
Check for velocities at bridges, culverts.
The City of Elk Grove adopted the County's Stormwater Ordinance, Erosion Control Code, and Improvement Standards

Appendix D-5

City of Folsom

Summary of Existing Programs for New Development

Appendix D-5: City of Folsom

Water Quality/Watershed Protection Principles and Policies (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Folsom General Plan: 1. Policy 1.1: New development shall preserve and/or enhance to the maximum degree feasible, the existing natural vegetation, landscape features and open space... 2. Policy 8.3: Open space will be required as part of each residential development except in residential estates, multifamily parcels of less than 10 acres and parcels of less than 20 acres for single family areas surrounded by existing development. 3. Policy 8.4: All residential development or residential portions of multi-use developments shall contain a minimum of 30 percent of land in natural or improved open space, exclusive of roadways and parking lots.
Master/Community Plans	
Zoning Code	FMC, Chapter 17.98 (Wetland and Riparian Habitat Management): 1. 17.98.010 (H): Utilize created wetlands as a natural filtration system for meeting NPDES requirements. 2. 17.98.050 (B3): Where facility or project encroaches into a wetland or riparian habitat, mitigation measures are required that result in a net gain in wetland and/or riparian habitat
Building Code	FMC, Chapter 14.29 (Grading): 1. 14.29.322(1): ...development...will maximize percolation and infiltration of precipitation into the ground and will minimize direct surface runoff... FMC, Chapter 14.33 (Hillside Developments): 1. 14.33.110 (B): Locate...improvements...to minimize the need for earth movement... 2. 14.33.110 (F): ...design of development projects...to preserve significant open spaces and concentrate development in parts of properties where environmental...impacts would be less severe. 3. 14.33.180 (6): The total amount of impervious surface, including buildings and paving, shall not exceed 60 percent of any lot in a hillside area.

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Folsom General Plan: 1. Policy 25.1: The surface and groundwater quality of Folsom shall not be degraded from City standards 2. Policy 28.2: The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality....
Master/Community Plans	The Humbug-Willow Creek Parkway Master Plan contains several policies and goals for protecting the open space and riparian corridors associated with Humbug and Willow Creek. The plan describes guidelines for development along the corridor including buffer zones, best management practices, the environmental benefits of wetlands and other riparian sources and details for designing water quality facilities.
Zoning Code	FMC, Chapter 17.98 (Wetland and Riparian Habitat Management): 1. 17.98.010 (H): Utilize created wetlands as a natural filtration system for meeting NPDES requirements.
Building Code	FMC, Chapter 8.70 (Stormwater Management and Discharge Control): 1. 8.70.200: Any discharger....shall undertake all practical measures to reduce such pollutants, including, but not limited to, those specific measures identified in , and required by, this article. FMC, Chapter 14.29 (Grading): 1. 14.29.330: Entire section is dedicated to Erosion Control and various methods of source control
Other	
City of Folsom Design and Procedures Manual and Improvement Standards	1. Section 10.12: De-watering discharges into to City drainage system must receive written approval by the Engineer. The Engineer may place any restriction that he deems necessary to control silt and discharge capacity problems within any portion of the drainage system. 2. Section 10.15: Section describes requirements for erosion and sedimentation control including preparation of a stormwater pollution prevention plan (SWPPP) and re-vegetation standards 3. Section 10.17: Discusses several guidelines for design of treatment controls 4. This design manual also includes references to the City/County Guidance Manual of On-Site Stormwater Quality Control Measures.
City Standard Conditions	1. The storm drain improvement plans shall provide for “Best Management Practices” that meet the requirements of the water quality standards of the City’s National Pollutant Discharge Elimination System Permit issued by the State Regional Water Quality Control Board. These facilities shall be constructed concurrent with construction of grading and the initial public improvements and shall be

Existing Program	
	<p>completed prior to final occupancy of the first building.</p> <ol style="list-style-type: none"> 2. The storm drain improvements shall provide for a storm drain interceptor for automatic fuel spill containment and recovery to the satisfaction of the Planning, Inspections and Permitting Department. These facilities shall be reviewed and approved by the City prior to approval of improvement plans and shall be completed prior to final occupancy of the first building. 3. The owner/applicant shall be responsible for litter control and sweeping of all paved surfaces in accordance with City standards. All on-site storm drains shall be cleaned immediately before the commencement of the rainy season (October 15). 4. Erosion and sedimentation control measures shall be incorporated into construction plans. These measures shall conform to the City of Folsom requirements and the County of Sacramento <i>Erosion and Sedimentation Control Standards and Specifications</i>-current edition and as directed by the Planning, Inspections and Permitting Department.

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Folsom General Plan:</p> <ol style="list-style-type: none"> 1. Policy 1.1: New development shall preserve and/or enhance to the maximum degree feasible, the existing natural vegetation, landscape features and open space... 2. Policy 8.3: Open space will be required as part of each residential development except in residential estates, multifamily parcels of less than 10 acres and parcels of less than 20 acres for single family areas surrounded by existing development. 3. Policy 8.4: All residential development or residential portions of multi-use developments shall contain a minimum of 30 percent of land in natural or improved open space, exclusive of roadways and parking lots.
Master/Community Plans	<p>The Humbug-Willow Creek Parkway Master Plan contains several policies and goals for protecting the open space and riparian corridors associated with Humbug and Willow Creek. The plan describes guidelines for development including buffer zones, best management practices, the environmental benefits of wetlands and other riparian sources and details for designing water quality facilities.</p>
Zoning Code	<p>FMC, Chapter 17.98 (Wetland and Riparian Habitat Management):</p> <ol style="list-style-type: none"> 1. 17.98.010: The City requires that site planning and management of wetland and riparian resources meet the following performance standards: Increase the preservation and protection of the city’s natural beauty, diversity, natural resources, and a high quality of life... Preserve, protect, restore and enhance wetlands and riparian habitats and their buffers; Recreate wetlands and riparian habitat within the same watershed location and...achieve no net loss... Utilize created wetlands as a natural filtration system for meeting NPDES requirements. 2. 17.98.050 (B3): Where facility or project encroaches into a wetland or riparian habitat, mitigation measures are required that result in a net gain in wetland and/or riparian habitat. <p>FMC, Chapter 17.39 (OSC, Open Space and Conservation District):</p> <ol style="list-style-type: none"> 3. Ordinance provides the permitted uses of open space and conservation districts and provides minimum and maximum area requirements such as Section 17.39.050 (5): <i>Natural Area Requirements: minimum of 50 percent of site in natural state or approved landscaping, exclusive of paved area.</i> <p>FMC Chapter 17.41 (HCD, Habitat Conservation District)</p> <ol style="list-style-type: none"> 4. Chapter provides for activities permitted within wetlands, wetland buffers or riparian habitat.
Building Code	<p>FMC, Chapter 14.33 (Hillside Developments):</p> <ol style="list-style-type: none"> 1. 14.33.110 (F): ...design of development projects...to preserve significant open spaces and concentrate development in parts of properties where environmental...impacts would be less severe.

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Folsom General Plan:</p> <ol style="list-style-type: none"> 1. Policy 1.1: New development shall preserve and/or enhance to the maximum degree feasible, the existing natural vegetation, landscape features and open space...
Master/Community Plans	<p>The Humbug-Willow Creek Parkway Master Plan contains several policies and goals for protecting the open space and riparian corridors associated with Humbug and Willow Creek. The plan describes guidelines for development including buffer zones, best management practices, the environmental benefits of wetlands and other riparian sources and details for designing water quality facilities.</p>
Zoning Code	<p>FMC, Chapter 17.98 (Wetland and Riparian Habitat Management):</p> <ol style="list-style-type: none"> 1. 17.98.010: The City requires that site planning and management of wetland and riparian resources meet the following performance standards: <ol style="list-style-type: none"> B. Increase the preservation and protection of the city’s natural beauty, diversity, natural resources, and a high quality of life... C. Preserve, protect, restore and enhance wetlands and riparian habitats and their buffers; 2. 17.98.050 (A1): Apply open space easements to portions of the project site that contain sensitive lands; or (A2) Rezone the sensitive habitat area to the habitat conservation district zone; or (A3) Require that wetland and riparian habitat buffer zones adjacent to regulated resources shall be of sufficient size so as to preserve the biological and hydrologic functions and the values of the resource areas protected; or (A4) Require a mitigation plan outlining specific criteria such as water quality standards, survival rate of planted vegetation, species abundance and diversity targets, habitat diversity indices, or other ecological, geological, or hydrological performance standards, or... 3. 17.98.050 (B4): No mature riparian woodland is destroyed or reduced in size due to otherwise allowed encroachment.
Building Code	<p>FMC, Chapter 14.29 (Grading):</p> <ol style="list-style-type: none"> 1. 14.29.110 (1); ..establishes standards...to...protect against erosion, maintain the natural environment, 2. 14.29.320: ...Grading, dredging or diking may not alter any intermittent or perennial stream as shown on any USGS seven and one-half minute map, except as permitted...from the California Department of Fish and Game... <p>FMC, Chapter 14.33 (Hillside Development)</p> <ol style="list-style-type: none"> 1. 14.33.110 (A): Ensure development patterns preserve and protect features of hillside areas including swales, canyons, knolls, ridgelines, rock outcrops, riparian and other wildlife habitats, streambeds, vernal ponds, and other water features, woodlands and significant trees; 2. 14.33.160 (C): Stream setbacks. Grading near intermittent and perennial natural streams shall be subject to the approval of the public works department....Larger setbacks may be required by the public works department to...preserve water quality or protect wildlife habitats.

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	
Master/Community Plans	
Zoning Code	FMC, Chapter 16.36 (Improvements) 1. 16.36.020 (C): The storm drain system may also be required to be designed for water quality control monitoring activities.
Building Code	
Other	
City Standard Conditions	<ol style="list-style-type: none"> 1. A water quality study shall be submitted by the owner/applicant and approved by the City prior to the approval of the first Final Map/Parcel Map. The number and configuration of parcels may need to be revised from that shown on the Tentative Map/Parcel Map to accommodate water quality improvements. 2. The owner/applicant shall prepare master plans for drainage (including boundaries of 100-year flood zone), to the satisfaction of the Planning, Inspections and Permitting.... Off-site improvements may include... water quality facilities, and drainage facilities including on or off-site Final lot configurations may need to be modified to accommodate the improvements identified in these studies.

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Folsom General Plan: 1. Policy 1.1: New development shall preserve and/or enhance to the maximum degree feasible, the existing natural vegetation, landscape features and open space...
Master/Community Plans	
Zoning Code	
Building Code	<p>FMC, Chapter 14.29 (Grading):</p> <ol style="list-style-type: none"> 1. 14.29.110 (1); ..establishes standards...to...protect against erosion, maintain the natural environment, 2. 14.29.110 (3);...establishes standards...to...control against dust and erosion and their consequent effects on soil structure and water quality 3. 14.29.330: Entire section is dedicated to Erosion Control and various methods of source control 4. 14.29.322: Drainage facilities are to be adequate to assure that the development will not result in stormwater runoff that could cause flooding, ponding, soil erosion, sediment production and sediment pollution. 5. 14.29.322 (2): In general, the release rate of stomwater from all parts of the subject site after development should not exceed the stormwater runoff rate from the area in its previous undeveloped state for all intensities and durations of rainfall. The carrying capacity of the channels downstream is to be considered in determining the permitted amount of stormwater release. 6. 14.29.322 (3):...if the drainage facilities discharge onto natural ground, the applicant is to proved a method to reduce the velocity of flow in order to prevent erosion... <p>FMC, Chapter 14.33 (Hillside Development)</p> <ol style="list-style-type: none"> 1. 14.33.110 (C): Foster development patters to avoid or minimize the risks from erosion... 2. 14.33.160 (C): Stream setbacks. Grading near intermittent and perennial natural streams shall be subject to the approval of the public works department...Larger setbacks may be required by the public works department to...preserve water quality or protect wildlife habitats.
Other	
City of Folsom Design and Procedures Manual and Improvement Standards	<ol style="list-style-type: none"> 1. Section 10.9.4: Where high velocities cannot be mitigated by use of conventional outfall erosion protection, Storm Drain Outfall Dissipaters, type 1 through 4, SD-38 through SD-41 shall be constructed. 2. Section 10.15: Section describes requirements for erosion and sedimentation control including preparation of a stormwater pollution prevention plan (SWPPP) and re-vegetation standards
City of Folsom Standard Conditions	<ol style="list-style-type: none"> 1. The storm drainage design shall provide for no net increase in run-off under post development conditions. 2. The storm drain improvement plans shall provide for “Best Management Practices” that meet the requirements of the water quality standards of the City’s National Pollutant Discharge Elimination System Permit issued by the State Regional Water Quality Control

Existing Program	
	<p>Board. These facilities shall be constructed concurrent with construction of grading and the initial public improvements and shall be completed prior to final occupancy of the first building.</p> <ol style="list-style-type: none"> 3. The owner/applicant shall be responsible for litter control and sweeping of all paved surfaces in accordance with City standards. All on-site storm drains shall be cleaned immediately before the commencement of the rainy season (October 15). 4. Erosion and sedimentation control measures shall be incorporated into construction plans. These measures shall conform to the City of Folsom requirements and the County of Sacramento <i>Erosion and Sedimentation Control Standards and Specifications</i>-current edition and as directed by the Planning, Inspections and Permitting Department.

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Folsom General Plan: 1. Policy 25.1: The surface and groundwater quality of Folsom shall not be degraded from City standards 2. Policy 28.2: The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality....
Master/Community Plans	The Humbug-Willow Creek Parkway Master Plan contains several policies and goals for protecting the open space and riparian corridors associated with Humbug and Willow Creek. The plan describes guidelines for development including buffer zones, best management practices, the environmental benefits of wetlands and other riparian sources and details for designing water quality facilities.
Zoning Code	FMC, Chapter 17.98 (Wetland and Riparian Habitat Management): 1. 17.98.010 (H): Utilize created wetlands as a natural filtration system for meeting NPDES requirements. FMC, Chapter 16.36 (Improvements) 1. 16.36.020 (C): The storm drain system may also be required to be designed for water quality control monitoring activities.
Building Code	FMC, Chapter 8.70 (Stormwater Management and Discharge Control): 1. 8.70.200: Any discharger...shall undertake all practical measures to reduce such pollutants, including, but not limited to, those specific measures identified in , and required by, this article. FMC, Chapter 14.29 (Grading): 1. 14.29.110 (1); ..establishes standards...to...protect against erosion, maintain the natural environment, 2. 14.29.110 (3);...establishes standards...to...control against dust and erosion and their consequent effects on soil structure and water quality 3. 14.29.330: Entire section is dedicated to Erosion Control and various methods of source control 4. 14.29.322: Drainage facilities are to be adequate to assure that the development will not result in stormwater runoff that could cause flooding, ponding, soil erosion, sediment production and sediment pollution. 5. 14.29.322 (2): In general, the release rate of stomwater from all parts of the subject site after development should not exceed the stormwater runoff rate from the area in its previous undeveloped state for all intensities and durations of rainfall. The carrying capacity of the channels downstream is to be considered in determining the permitted amount of stormwater release. 6. 14.29.322 (3):...if the drainage facilities discharge onto natural ground, the applicant is to proved a method to reduce the velocity of flow in order to prevent erosion...
Other	
City of Folsom Design and Procedures Manual and Improvement Standards	1. Section 10.12: De-watering discharges into to City drainage system must receive written approval by the Engineer. The Engineer may place any restriction that he deems necessary to control silt and discharge capacity problems within any portion of the drainage system.

Existing Program	
	<ol style="list-style-type: none"> 2. Section 10.15: Section describes requirements for erosion and sedimentation control including preparation of a stormwater pollution prevention plan (SWPPP) and re-vegetation standards 3. Section 10.17: Discusses several guidelines for design of treatment controls 4. This design manual also includes references to the City/County Guidance Manual of On-Site Stormwater Quality Control Measures.
City of Folsom Standard Conditions	<ol style="list-style-type: none"> 1. The storm drainage design shall provide for no net increase in run-off under post development conditions. 2. The storm drain improvement plans shall provide for “Best Management Practices” that meet the requirements of the water quality standards of the City’s National Pollutant Discharge Elimination System Permit issued by the State Regional Water Quality Control Board. These facilities shall be constructed concurrent with construction of grading and the initial public improvements and shall be completed prior to final occupancy of the first building. 3. The storm drain improvements shall provide for a storm drain interceptor for automatic fuel spill containment and recovery to the satisfaction of the Planning, Inspections and Permitting Department. These facilities shall be reviewed and approved by the City prior to approval of improvement plans and shall be completed prior to final occupancy of the first building. 4. The owner/applicant shall be responsible for litter control and sweeping of all paved surfaces in accordance with City standards. All on-site storm drains shall be cleaned immediately before the commencement of the rainy season (October 15). 5. Erosion and sedimentation control measures shall be incorporated into construction plans. These measures shall conform to the City of Folsom requirements and the County of Sacramento <i>Erosion and Sedimentation Control Standards and Specifications</i>-current edition and as directed by the Planning, Inspections and Permitting Department.

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

	Existing Program
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Folsom General Plan: 1. Policy 25.1: The surface and groundwater quality of Folsom shall not be degraded from City standards 2. Policy 28.2: The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality....
Master/Community Plans	
Zoning Code	
Building Code	FMC, Chapter 14.29 (Grading): 1. 14.29.110 (1); ..establishes standards...to...protect against erosion, maintain the natural environment, 2. 14.29.110 (3);...establishes standards...to...control against dust and erosion and their consequent effects on soil structure and water quality 3. 14.29.322: Drainage facilities are to be adequate to assure that the development will not result in stormwater runoff that could cause flooding, ponding, soil erosion, sediment production and sediment pollution. 4. 14.29.322 (2): In general, the release rate of stomwater from all parts of the subject site after development should not exceed the stormwater runoff rate from the area in its previous undeveloped state for all intensities and durations of rainfall. The carrying capacity of the channels downstream is to be considered in determining the permitted amount of stormwater release. 5. 14.29.322 (3):...if the drainage facilities discharge onto natural ground, the applicant is to proved a method to reduce the velocity of flow in order to prevent erosion...
Other	
City of Folsom Design and Procedures Manual and Improvement Standards	1. Section 10.9.4: Where high velocities cannot be mitigated by use of conventional outfall erosion protection, Storm Drain Outfall Dissipaters, type 1 through 4, SD-38 through SD-41 shall be constructed.
City of Folsom Standard Conditions	1. The storm drainage design shall provide for no net increase in run-off under post development conditions.

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection (*note conflicts, if any*)

1. City General Plan Policy 25.1: The surface and groundwater quality of Folsom shall not be degraded from City standards.
2. FMC Chapter 8.70.020.B6 (Stormwater Management and Discharge Control): It is the intent of the city council in adopting this chapter to provide the city with the legal authority to ...prevent the contamination of groundwater pollution as a result of pollution migration from the city stormwater conveyance system.

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other (note conflicts, if any)

1. General Plan Policy 28.2: The quality and **quantity of surface water runoff** from a property **shall not exceed existing flows** or existing quality....
2. FMC, Chapter 14.29.322 (2): In general, the **release rate** of stormwater from all parts of the subject site after development **should not exceed** the stormwater runoff rate from the area in **its previous undeveloped state for all intensities and durations of rainfall**. The carrying capacity of the channels downstream is to be considered in determining the permitted amount of stormwater release.
3. City Design and Procedures Manual: Section 10.9.4: Where **high velocities cannot be mitigated** by use of conventional outfall erosion protection, Storm Drain Outfall Dissipaters, type 1 through 4, SD-38 through SD-41 shall be constructed.
4. City Standard Condition: The storm drainage design shall provide for **no net increase in run-off under post development conditions**.

In general, stormwater volumes are considered when sizing treatment or detention facilities such as water quality ponds, swales and interceptors.

Appendix D-6

City of Galt

Summary of Existing Programs for New Development

Appendix D-6: City of Galt

Water Quality/Watershed Protection Principles and Polices (Permit Provision 16a)

Each Permittee shall incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g., Comprehensive, Master or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. (16a) The DSP shall include a description of necessary modifications to existing codes and ordinances and an implementation schedule for these modifications. (19j)

Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	
Master/Community Plans	
Zoning Code	
Building Code	
Other	
Galt Landscape Manual	A minimum of 10% of parking areas shall be landscaped with live materials.

Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	
Master/Community Plans	
Zoning Code	Mandatory Site Plan Review or Conditional Use Permits for new multi-family, commercial and industrial uses allows for identification and mitigation of potential pollutant sources using sound engineering principles.
Building Code	
Other	City of Galt Quarterly Newsletter and periodic newspaper articles related to such issues as draining of pools to the sewer system and cleaning leaves and other debris from yards and gutters are published and mailed to all Galt residents regularly.
Improvement Plan General Notes	Developer required to stamp/decal all drain inlets with notification that “drains to creek”. City has an ongoing program to locate and label all drain inlets in accordance with the permit. Volunteers are regularly recruited to retrofit old inlets.
City Policy	City street sweeper clans all city streets every other week.

Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones.
 (16a.iii)

	Existing Program (note conflicts, if any)*
<p>General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)</p>	<p>Conservation/Open Space Element Policy 8. Protect existing riparian vegetation along the main stream courses in the City. Implementation Program 8a and 8d-Designate the natural stretches of Dry Creek, Hen Creek and Deadman Gulch as open space on the General Plan. Amend Zoning ordinance to zone these areas as Open Space. Conservation/Open Space Element Implementation Program 8c-In any development where elimination or substantial disturbance of wetlands is unavoidable, and no non-wetland alternative sites are available; the City shall require mitigation for the wetlands which results in no net loss. Any such mitigation shall account for not only total acreage loss, but also the type and quality of habitat lost and the sensitivity of species it supports.</p> <p>Conservation/Open Space Element Policy 9-Where stream modifications are needed to prevent flooding, where possible, require a natural floodway incorporating as much of the existing vegetation as possible. When possible, create additional wetlands along drainage features, in retention basins, and in parks, setback development including roads, from stream courses a sufficient distance to prevent damage to these areas. (Stream modification should only be necessary if additional flows will increase the size of the floodplain). Implementation Program 9-revise flood combining district to incorporate these concepts and zone appropriate areas accordingly.</p> <p>Conservation/Open Space Element Policy 10-Protect mature native trees, vernal pools, and any threatened endangered, or other sensitive species in new development. Implementation Program 10-Revise development applications to request information on the presence of trees, vernal pools or other habitat indicative of sensitive species and how the project has attempted to preserve them.</p> <p>Conservation/Open Space Element Policy 12-Provide for EIRs which recognize Galt’s particular information needs and which consider policies above in both evaluating the significance of impacts and provide for adequate mitigation. Implementation Programs 12a-f.-Require an EIR in most cases when disturbance is proposed of 1) any water influenced land containing native plants, including vernal pools and stream or river courses; 2) any native tree stand having substantial habitat value by itself or in combination with other habitat in the region. Botanical surveys for any projects which cross the EIR threshold. Consideration of off-site mitigation to compensate for any on-site significant impacts which cannot be mitigated on-site. This off-site mitigation may include the planting of wetland vegetation, or native trees or shrubs in parks and cemeteries, along roadways and flood channels, and in railroad and utility easements. Consideration of open space links to larger natural areas in evaluating impacts and considering on-site and any off-site mitigation. That mitigation measures emphasize avoidance over transplantations or relocation.</p> <p>Conservation/Open Space Element Policy 13-Direct development activities away from 100-year floodplain of natural streams in order to minimize health and safety hazards, property loss, and environmental disruption and</p>

	foster stream enhancement, improved water quality, recreational opportunities and groundwater recharge. In directing development, make it clear to all potential developers where these streams are located. Implementation Programs 13 a-b. Adoption of this General Plan’s Open Space Conservation Element, and the Land use Map showing the Open Space designation for the channel and floodplain of Dry Creek, Hen Creek, and Deadman Gulch. Create a new Open Space zone district which applies to the City’s stream courses and other areas and which contains regulations consistent with the policies of the Open Space and Conservation Element.
Master/Community Plans	Galt Northeast Area Specific Plan’s Deadman Gulch Parkway and South Branch Marsh Development Standard. A buffer is required along Deadman Gulch of 24 feet-30 feet and a single loaded street is required for public access/view.
Zoning Code	Open Space Zoning District has been applied to all stream courses/floodplains. The purpose statement (Section 18.12.020A of the Galt Zoning Code reads “OS, Open Space). To provide a limited-access environment for open space uses. This zoning district is characterized by very large lots and is designed to protect persons from natural hazards, to provide for areas of relatively passive, nature-oriented recreational uses, to maintain or restore flora and fauna habitats, and to maintain open visual corridors free from urban development.
Building Code	
Other	

Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Note same General Plan policies/implementation programs as previous topic.</p> <p>Conservation/Open space Element Policy 28-Require an EIR for any mining operation which is proposed in areas having riparian characteristics.</p> <p>Conservation/Open Space Element Policy 29-Prohibit mining activity within Dry Creek or any other waterway which would impact the unique riparian and recreational resources of the Creek. Implementation Program-Do not include mining among the permitted uses of the Open Space zoning district.</p> <p>Safety and Seismic Element Policy 10-Prohibit development in currently undeveloped floodplains and continue to implement flood zone policies and the City’s flood control ordinance which minimizes potential loss of property and threat to human lift.</p> <p>Land Use Policy 36-Provide for Open spaces within the community. The intent of this designation is to recognize the need for outdoor recreation and special uses such as agriculture and cemeteries, as well as the hazards inherent in flooding. The type of open space shall indicate on the implementing zoning map by the name “recreation” and “floodplain” combining zones. Types of Uses: Natural habitat, outdoor parks and recreation, water courses and drainage facilities, agriculture and similar uses.</p>
Master/Community Plans	Note same Northeast Area Specific Plan standards as previous topic.
Zoning Code	See previous topic regarding Open Space zoning.
Building Code	
Other	

Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation/Open Space element Policy 14-Prevent problems of flood control in areas where stream channels have been modified by requiring an improved natural floodway design (This will occur primarily in areas where increased upstream flows due to new urban development will flow into drainages which have been channelized into agricultural ditches).</p> <p>Conservation/Open Space Element Policy 16-Ensure that future developments do not significantly increase peak stormflows and do not cause significant flooding of downstream facilities and properties. Implementation Program-Require hydrological analysis of individual developments to determine their effects on peak stormflows. Recognizing potential cumulative drainage, require any drainage facilities necessary to prevent significant impacts on downstream properties and drainage facilities.</p> <p>Conservation/Open Space Element Policy 20 and Public Facilities Element Policy 13-To the extent feasible, protect the quality of stormwater runoff. Implementation Program-Environmental review of new development shall include an analysis of the feasibility and effectiveness of Best Management Practices (BMPs) for cleansing runoff. Specifically, the following BMPs should be considered: Detention/Retention ponds/wetlands, infiltration trenches and basins, porous pavement, sediment, oil and grease traps, grass swales, consolidated discharges for retrofit with future treatment systems.</p>
Master/Community Plans	Galt Northeast Area Specific Plan drainage master plan analyzed the increased flows and required development of a natural floodway concept with low flow channel and vegetated bench. See Attachment 2 Excerpt from NEASP.
Zoning Code	Mandatory Site Plan Review or Conditional Use Permits required for all new multi-family, commercial or industrial uses. Allows identification and mitigation of potential increases in pollutant loads and flows.
Building Code	
City Improvement Plan Standards	Developer required to stamp/decals all drain inlets with notification that “drains to creek”.
City Policy	<p>City street sweeper cleans all city streets every other week.</p> <p>Developers are required to implement structural BMPs to capture pollutant loads prior to outfall to natural waterway or connection to the City’s stormwater system.</p>

Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>See same policies/programs under 16 a.iii</p> <p>Conservation/Open Space Element Policy 14-Prevent problems of flood control in areas where stream channels have been modified by requiring an improved natural floodway design (This will occur primarily in areas where increased upstream flows due to new urban development will flow into drainages which have been channelized into agricultural ditches).</p> <p>Safety and Seismic Element Policy 9-Require a grading and erosion control plan to be prepared or reviewed by a qualified engineer as part of site plan approval.</p>
Master/Community Plans	
Zoning Code	
Building Code	
Other	The City's Improvement Plan Standard Notes require dust control during all phases of construction (generally a water truck etc.)

Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)

	Existing Program (note conflicts, if any)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	Conservation/Open Space Element Policy 20 and Public Facilities Element Policy 13- To the extent feasible, protect the quality of stormwater runoff. Implementation Program-Environmental review of new development shall include an analysis of the feasibility and effectiveness of Best Management Practices (BMPs) for cleansing runoff. Specifically, the following BMPs should be considered: Detention/Retention ponds/wetlands, infiltration trenches and basins, porous pavement, sediment, oil and grease traps, grass swales, consolidated discharges for retrofit with future treatment systems.
Master/Community Plans	Galt Northeast Area Specific Plan drainage master plan analyzed the increased flows and required development of a natural floodway concept with low flow channel and vegetated bench. See Attachment 2 Excerpt from NEASP.
Zoning Code	
Building Code	
City Improvement Plan Standards	Developer required to stamp/decal all drain inlets with notification that “drains to creek”.
City Policy	City street sweeper cleans all city streets every other week.

Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

	Existing Program (<i>note conflicts, if any</i>)*
General Plan (<i>Land Use, Housing, Conservation, Open Space Elements</i>)	<p>Conservation/Open Space Element Policy 14-Prevent problems of flood control in areas where stream channels have been modified by requiring an improved natural floodway design (This will occur primarily in areas where increased upstream flows due to new urban development will flow into drainages which have been channelized into agricultural ditches).</p> <p>Conservation/Open space Element Policy 16-Ensure that future developments do not significantly increase peak stormflows and do not cause significant flooding of downstream facilities and properties. Implementation Program-Require hydrological analysis of individual developments to determine their effects on peak stormflows. Recognizing potential cumulative drainage, require any drainage facilities necessary to prevent significant impacts on downstream properties and drainage facilities.</p>
Master/Community Plans	Galt Northeast Area Specific Plan development standards for Deadman Gulch parkway (natural floodway design). See Attachment 1.
Zoning Code	
Building Code	
Other	

Infiltration and Groundwater Protection (Permit Provision 19g)

To protect groundwater quality, the Permittee shall apply restrictions to the use of structural BMPs designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). Such restrictions shall ensure that the use of such infiltration structural treatment BMPs shall not cause a violation of applicable groundwater quality standards.

Describe How Existing Program Addresses Groundwater Protection (*note conflicts, if any*)

Nothing currently, intend to add section on groundwater protection from wells to city ordinance(s).

Downstream Erosion (Permit Provision 19h)

The DSP shall include any existing criteria or proposed modifications to ensure that discharges from new development and significant redevelopment address the potential for downstream erosion and protect stream habitat. At a minimum, the Permittees' Development Standards process shall consider the need for measures to control peak storm water discharge rates and velocities in order to protect downstream erosion and stream habitat. Storm water discharge volumes and durations should also be considered in the Development Standards.

Existing Criteria/Other (*note conflicts, if any*)

Galt municipal code, Chapter 16.30 (Grading) and Improvement Standards (Galt uses Sacramento County Improvement Standards)

Appendix E

Draft Technical Memorandum:

Recommended Tools for Addressing Water Quality
and Watershed Protection Principles

DRAFT
NOV. '03

POTENTIAL TOOLS FOR ADDRESSING WATER QUALITY AND WATERSHED PROTECTION PRINCIPLES

prepared for

Sacramento Stormwater Management Program
City of Citrus Heights
City of Elk Grove
City of Folsom
City of Galt
City of Sacramento
County of Sacramento

prepared by

CATALYST

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 Larry Walker Associates

26 November 2003

PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide descriptions of a range of planning tools that could be considered by the Sacramento Stormwater Management Program Permittees (Permittees) to amend their existing programs as needed to better address water quality and watershed protection principles. The principles are outlined in the Sacramento NPDES Stormwater Permit No CAS082597, Provision 16a. The tools discussed in this memorandum could be incorporated into general or community/specific plans, policies, codes, standards and guidelines that direct or guide land use decisions.

This memorandum presents the tools in three categories: plans and policies, ordinances and codes, and design/ improvement standards and guidelines.

A Tools Matrix is included, which relates each proposed tool to the principle(s) addressed. Following the matrix, each tool is described in further detail, with drawings, web site links, local examples and examples from other programs in the state or the nation.

WATER QUALITY AND WATERSHED PROTECTION PRINCIPLES

The Stormwater Permit requires the Permittees to review and update their existing development standards program. Provision 16a requires the Permittees to incorporate water quality and watershed protection principles into planning procedures and policies such as: the General Plan or equivalent plans (e.g. Comprehensive, Master, or Community Plan) to direct land use decisions and require implementation of consistent water quality protection measures for all development projects. Such water quality and watershed protection principles and policies must consider the following:

Permit Provision 16a

- i. Minimize the amount of impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and use on-site infiltration of runoff in areas with appropriate soils where the infiltration of storm water would not pose a potential threat to groundwater quality. (16a.i)
- ii. Implement pollution prevention methods supplemented by pollutant source controls and/or treatment controls. Where practical, use strategies that control the sources of pollutants or constituents (i.e., the point where water initially meets the ground) to minimize the transport of storm water and pollutants offsite and into MS4s. (16a.ii)

- iii. Preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands and buffer zones. (16a.iii)
- iv. Limit disturbances of natural water bodies and natural drainage systems caused by development, including roads, highways, and bridges. (16a.iv)
- v. Use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads in runoff. (16a.v.)
- vi. Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss. (16a.vi)
- vii. Implement source and/or treatment controls as necessary to protect downstream receiving water quality from increased pollutant loads in runoff flows from new development and significant redevelopment. (16a.vii)
- viii. Control the post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat (16a.viii)

TOOLS MATRIX

The Tools Matrix presented in this section is the result of an information-sharing workshop held with the Permittees and experienced stormwater planning consultants in August 2003. It includes almost 40 tools and shows the water quality or watershed protection principle addressed by each, along with a page number for locating additional details about each tool. The matrix suggests how each tool addresses each of the eight Development Standard Principles. A bullet (●) indicates that a tool, in the judgement of the workshop participants, addresses a particular principle.

Plans & Policies			Addresses Development Standard Principles*							
			i	ii	iii	iv	v	vi	vii	viii
PAGE	TOOL									
PP1	5	Incorporate smart growth principles in General Plan.	●		●	●		●	●	●
PP2	6	Adopt a transit-oriented land use designation in the General Plan.	●		●	●		●	●	●
PP3	6	Encourage new or denser development near transit nodes.	●		●	●		●	●	●
PP4	7	Encourage cluster and compact development.	●		●	●		●	●	●
PP5	7	Adopt context-sensitive design for streets as a planning principle.	●	●					●	
PP6	8	Encourage reduced parking lot coverage.	●							
PP7	8	Protect and strengthen existing ecological systems.		●	●	●		●	●	●
PP8	10	Maximize opportunities for creating open space.			●	●		●	●	●
PP9	10	Regulate development adjacent to waterways.			●	●		●	●	●
PP10	12	Take advantage of opportunities presented by joint use facilities.		●					●	●
PP11	12	Maximize use of pervious pavements.	●	●					●	●
PP12	13	Maintain or establish open space requirements or buffer zones at creeks, create or preserve natural meanders.			●	●		●	●	●
PP13	13	Maintain surface and groundwater quality.	●	●	●	●		●	●	●
PP14	14	Maintain quality and quantity of surface and runoff water to existing flows and quantities.	●	●	●	●		●	●	●
PP15	14	Encourage public access and building orientation to open space; especially along creeks.	●	●					●	●
PP16	15	Develop hillside development ordinances to stipulate topographic sensitivity, setbacks, approval process		●				●	●	●
PP17	16	Assess pollution loads and flows as new master plans are proposed.						●		

*Principles: i. Minimize impervious surfaces, use infiltration, where feasible.
 ii. Implement pollution prevention source and treatment controls.
 iii. Preserve, create, restore riparian corridors, wetlands and buffer zones.

iv. Limit disturbances of natural water bodies and drainage systems.
 v. Use existing drainage plans to estimate increases in loads and flows.
 vi. Protect sensitive areas from erosion and sediment loss.

vii. Implement BMPs to protect downstream receiving water.
 viii. Control peak storm water run-off rates and velocities.

Codes & Ordinances			Addresses Development Standard Principles*							
			i	ii	iii	iv	v	vi	vii	viii
CO.1	17	Adopt smart growth codes and ordinances.	●		●	●		●	●	●
CO.2	17	Adopt transit-oriented zoning codes and ordinances.	●		●	●		●	●	●
CO.3	18	Adopt context-sensitive street design in zoning codes and ordinances.	●		●	●		●	●	●
CO.4	18	Develop codes and ordinances to regulate property along wetlands and riparian corridors.			●	●		●	●	●
CO.5	19	Develop hillside development ordinances to stipulate topographic sensitivity, setbacks, approval process (see PP.16.)		●			●	●	●	●
CO.6	19	Author code to reduce pollutants in stormwater.		●					●	●
CO.7	20	Stipulate legal authority to require source and treatment controls are given to agency head.	●	●					●	●

*Principles: i. Minimize impervious surfaces, use infiltration, where feasible.
 ii. Implement pollution prevention source and treatment controls.
 iii. Preserve, create, restore riparian corridors, wetlands and buffer zones.

iv. Limit disturbances of natural water bodies and drainage systems.
 v. Use existing drainage plans to estimate increases in loads and flows.
 vi. Protect sensitive areas from erosion and sediment loss.

vii. Implement BMPs to protect downstream receiving water.
 viii. Control peak storm water run-off rates and velocities.

Standards & Guidelines			Addresses		Development Principles*			Standard	
			i	ii	iii	iv	v	vi	vii
	PAGE	TOOL							
SG.1	21	Develop context-sensitive street standards and guidelines.	●	●				●	●
SG.2	22	Develop parking standards requiring pervious paving.	●	●				●	●
SG.3	22	Author standards to regulate development adjacent to waterways.		●	●	●		●	●
SG.4	23	Incorporate BMPs in new and re-development and require them as a condition of approval for projects.	●	●			●		●
SG.5	23	Establish design standards for BMP's		●					
SG.8	24	Develop a plant selection list to advise users.		●	●			●	●

*Principles: i. Minimize impervious surfaces, use infiltration, where feasible.
 ii. Implement pollution prevention source and treatment controls.
 iii. Preserve, create, restore riparian corridors, wetlands and buffer zones.

iv. Limit disturbances of natural water bodies and drainage systems.
 v. Use existing drainage plans to estimate increases in loads and flows.
 vi. Protect sensitive areas from erosion and sediment loss.

vii. Implement BMPs to protect downstream receiving water.
 viii. Control peak storm water run-off rates and velocities.

DESCRIPTION OF TOOLS

This section of the memorandum presents descriptive information and local/national examples of how the tools can be applied. Drawings and web site links are also provided where available.

PP.1. Incorporate smart growth principles in General Plan.

“Smart growth is not a predetermined utopian vision of the future. It is rather an attempt to correct the ills of our current development pattern in principled and time-tested ways. Many of the principles of smart growth are not new. They are based on practices that have produced some of our most desirable living environments, be they small towns, suburban communities, or large cities. Smart growth does not seek to overturn the wishes of residents or communities desiring a more dispersed lifestyle, nor does it attempt to prescribe a one-size-fits-all pattern for living. It is primarily a series of alternatives to current development patterns that seeks to alleviate some of our current urban woes.

All smart growth principles involve the concept of promoting more livable and functional communities. Advocates define smart growth communities as environments that:

- enhance mobility for all residents, not just those with automobiles, as they carry out daily tasks, such as traveling to work or school, shopping, and maintaining community ties;
- accommodate the need for new housing, employment growth, and population increase by making the most efficient use of urban land;
- preserve and protect important open space and species habitat;
- are respectful of the needs of neighboring jurisdictions and the region as a whole; and
- make the carrying out of smart growth practices by developers, lenders, builders, and other interested parties as simple and streamlined as possible.”

(Source: *Smart Growth in the San Francisco Bay Area: Effective Local Approaches*. San Francisco District Council of the Urban Land Institute <http://sfbayarea.uli.org/smartgrowth.pdf>)

Smart growth has a beneficial impact on stormwater quality because it concentrates development and enables preservation of open space, natural resources, and the environment. The following are examples of jurisdictions that have incorporated smart growth into their General Plan.

Example 1. City of Sacramento, General Plan, Overall Urban Growth Policy Statements

Policy 4 – New Growth Areas

It is the policy of the City to approve development in the City’s new growth areas that promotes efficient growth patterns and public service extensions, and is compatible with adjacent developments. Page 1-32

- New growth area development will be allowed when all necessary infrastructure is available or will be provided, if is consistent with the City’s urban growth and annexation policies, and promotes orderly and efficient growth.

Policy 5 – Urban Conservation and Infill Areas

It is the policy of the City to promote the reuse and rehabilitation of existing urban development as a means to meet projected growth. Page 1-33

- The City should declare existing neighborhoods where reuse and rehabilitation are needed as a high priority when targeting public expenditures and other resources.

Policy 10 – Open Space and Natural Resource Conservation

It is the policy of the City to conserve and protect natural resources and planned open space areas, and to phase the conservation of agricultural lands to planned urban uses. Page 1-35

- The City will continue to provide open space for the preservation and conservation of natural resources. The City will continue programs established by the Department of Parks and Community Services in maintaining parks, trees, and other landscaping. The City will conserve riparian forests and grassland vegetation. The City will protect planned open space areas that support wildlife habitat and work with the County in protecting unique physical features. The City will establish development standards to enhance the visual amenities of open space areas.
- The City will provide open space for, and the conservation of the managed production of resources as defined in the Conservation and Open Space Element. The City will work with the County to study an agricultural preservation program. The City will allow the extraction of construction grade aggregate and assure that depleted aggregate pits are reclaimed for appropriate uses.

The City will provide open space for recreation. The American and Sacramento River Parkways will be conserved and protected. The city has other open space areas that can also be developed to their recreational use potential. These areas include utility easement, floodways and flood plains.

PP.2. Adopt a transit-oriented land use designation in the General Plan.

Transit-oriented development (TOD) is a term used to describe medium- to high-density development within a convenient walk of a major transportation stop. TOD's generally are comprised of a mix of residential, commercial, retail, and office uses. TOD's are less harmful to the environment than traditional development and can accommodate new growth without adding a burden to a jurisdiction's infrastructure. Residents and employees of TOD's drive less, conduct more activities on-site, and walk more than those in auto-oriented development. TOD's, if coupled with other planning tools such as urban growth boundaries, provide opportunities for better air quality, increased open space, and less land disturbance.

Example 1. County of Sacramento, General Plan Land Use Element

Urban Transit-Oriented Development.

The Urban Transit-Oriented Development designation allows mixed-use developments of relatively high residential densities and nonresidential intensities. Urban TODs are expected to be between 20 and 160 acres in size with residential densities in the core ranging from 7 to 50 units per gross acre, with a minimum average varying on the basis of location and facility status. The secondary areas surrounding the TOD cores are to have a minimum average density of 6 dwelling units per acre.

Neighborhood Transit-Oriented Development.

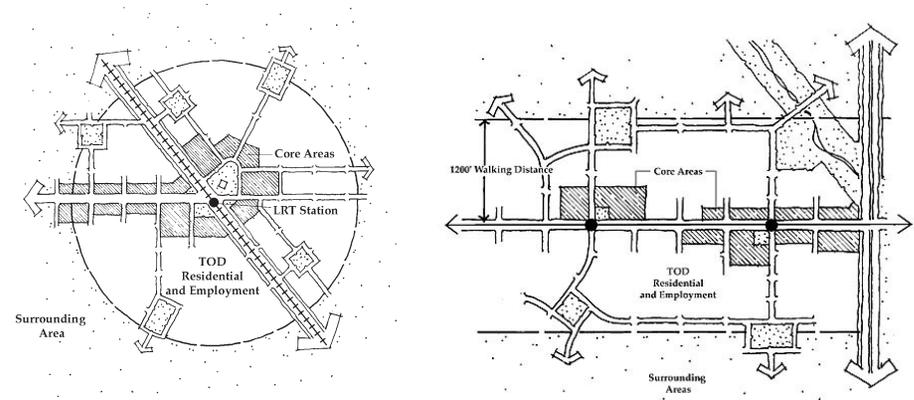
The Neighborhood Transit-Oriented Development designation allows mixed-use communities at moderate densities that are along the Feeder Line Network of the transit system and within 10 minutes travel time of the Trunk Line Network. Neighborhood TODs may be located on bus lines not shown on the Transportation Plan, or may be served by a private transit system (e.g., jitney, vanpool, transit shuttle service) as long as that transit meets the level of service defined for the Feeder Line Network. A Neighborhood TOD may be between 20 and 160 acres in size and have residential densities ranging from 7 to 30 units per gross acre with a suggested minimum average density varying on the basis of location and facility status. Like the Urban TOD, the secondary area in the Neighborhood TOD is to have a minimum density of 6 dwelling units per gross residential acre.

PP.3. Encourage new or denser development near transit nodes.

Policies that seek to place new or denser development near transit nodes puts housing, employment, and additional compatible uses within a convenient walking distance to one another. At the regional scale, this policy reduces the amount of sprawl development and reduces impervious land coverage.

Example 1. City of Sacramento, 65th Street/University Transit Village Plan

<http://www.cityofsacramento.org/planning/longrange/South%2065th%20Area%20Plan/projdesc060403.pdf>



Nodal (left) and corridor (right) transit-oriented development diagrams.

Source: Calthorpe Associates

PP.4. Encourage cluster and compact development.

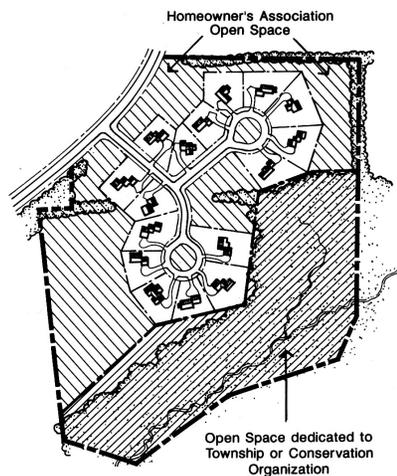
Cluster and infill development are tools that can assist in minimizing impervious surfaces and preserving open space. Cluster development, also termed cluster subdivision, open-space development, conservation development, hamlet development, and village development, is an important tool for open space and habitat preservation. Cluster development sites houses on smaller parcels of land than in conventional development requiring less road surface, while the land that would have been designated to individual lots is used as common shared open space. The open space is typically protected by a conservation easement that disallows any development in perpetuity.

Compact development, including infill development, is another important tool for land use planning. Compact development occurs in areas with existing development and intensifies uses on less land than conventional development. Jurisdictions that encourage compact development may provide more opportunities for open space and agricultural preservation.

Example 1. City of Palo Alto Comprehensive Plan

Policy N-7, City of Palo Alto Open Space Development Criteria

4. Development should be clustered, or closely grouped, in relation to the area surrounding it to make it less conspicuous, minimize access roads, and reduce fragmentation of natural habitats.



Cluster development can have the same number of residential lots with more open space than conventional development. This illustration shows open space ownership options.

Source: Growing Greener: Putting Conservation into Local Plans and Ordinances, Randall Arendt

PP.5. Adopt context-sensitive design for streets as a planning principle.

“Context sensitive design (CSD) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSD is an approach that considers the total context within which a transportation improvement project will exist.”

(Source: Federal Highway Administration, <http://www.fhwa.dot.gov/csd/index.htm>)

Example 1. California Department of Transportation, Division of Design Context Sensitive Solutions

Quality transportation design is the culmination of philosophy and principles in the project development process that provides a transportation system that enhances the place in which it serves. Whether a project is in an urban, rural or natural setting, the transportation facility must be in harmony with the community goals and the natural environment. The purpose of this (program) is to provide designers with department policy, guidance and examples to ensure the protection and enhancement of the environment and quality of life while meeting transportation needs in California.

<http://www.dot.ca.gov/hq/oppd/context/>

PP.6. Encourage reduced parking lot coverage.

Example 1. City of Olympia (WA) Public Works Department

1. Make reduction of impervious surfaces a goal of parking policies and regulations. Use site plan reviews and policy revisions as opportunities for addressing the problem of excess parking.
2. Establish parking requirements that accurately reflect parking needs for various land uses. Typically, parking regulations are based on artificially low “minimum” parking ratios that do not accurately reflect parking needs. Parking regulations should accurately reflect parking needs for various land uses and be based on high average use-instead of single peak day projections. Suggested ways to accomplish this goal include:
 - a. Establish “median” parking ratios that reflect parking needs;
 - b. If “minimum” ratios are used, establish “maximum” ratios in conjunction with minimums; and
 - c. encourage the use of transportation demand management techniques as an alternative to exceeding “median” or “maximum” ratios.
3. Establish cooperative parking regulations to reduce impervious surfaces. Smaller and fewer parking lots can result from cooperative parking. Developers and local jurisdictions can reduce the size of parking lots through shared, joint, or coordinated parking.

PP.7. Protect and strengthen existing ecological systems.

Example 1. City of Sacramento, General Plan, Section 6 Conservation and Open Space Element, Preservation of Natural Resources

Goal B

Retain the riparian woodlands and grassland vegetation along the waterways and floodways in North Natomas and South Sacramento insofar as possible. Page 6-13

Policy 1

Protect the wooded areas along the waterways and drainage canals insofar as possible.

Policy 2

Explore ways to conserve a modified floodplain environment along Laguna Creek in South Sacramento to the extent feasible.

Goal C

Conserve and protect the planned open space areas along the American and Sacramento Rivers, floodways and undevelopable floodplains to the extent feasible. Page 6-13

Policy 1

Retain the habitat areas where known endangered wildlife exists to the extent feasible.

Goal D

Work with the County of Sacramento to identify, protect and enhance physical features and settings that are unique to the area to the maximum extent feasible. Page 6-14

Policy 1

Conserve vernal pools with rear and endangered species to whatever extent feasible.

Goal E

Establish development standards for water related open space lands throughout the City to enhance the visual amenities of these uses. Page 6-14

Policy 1

Explore ways to reverse degradation and pollution and enhance the beauty and wild-life habitats of creeks and drainage canals.

Policy 2

Explore ways to preserve the undeveloped open space areas and wildlife habitats along Dry Creek, Arcade Creek, Magpie Creek, Fisherman’s Lake, the area south of Woodlake Park, Morrison Creek, Elder Creek, Laguna Creek, Beach Lake and drainage canals.

Policy 3

Design new floodways to be built in North Natomas and South Sacramento, to be aesthetically pleasing and offer limited passive recreation as well as wildlife sanctuaries. PP.3. Minimize impervious surfaces for all new development , require 10% of site to be landscaped and pervious surfaces.

Example 2. City of Sacramento, 65th Street/University Transit Village Plan.

Goals and Policies

C1. LAND USE

Open Space and Community Facilities Page 15

Goal 10: Promote a relationship to the natural environment and increase human comfort through use of appropriately suited vegetation.

10.1 A minimum of 10 percent of the site shall be landscaped and pervious surfaces. Landscaping that serves as a storm water treatment element and/or pedestrian plazas may be used to satisfy this requirement.

C3. CIRCULATION/INFRASTRUCTURE

Utilities Page 28

Goal 26: Ensure a balanced approach to resolving drainage and sewer issues through the transit village area.

26.2 In order to reduce impacts to existing and planned storm water and sewer drain system, new development will have a minimum target level of site perviousness of 10% (note: on site design improvements (e.g., parking lots as detention) off site improvements or fees may be required in lieu of this requirement). Site design mitigation measures, subject to the approval of the Utilities Director, may include: Barrier retention (berm, wall, planter, etc.), Depression storage (lawn, garden, parking lot, pond, athletic field, etc.), Land leveling, Terracing, Porous pavement, Driveway or parking lot under drain, shallow percolation (leach field), deep percolation (well),

above-grade storage (rooftop, water tower), sub-grade storage (tank, rock layer), soil modification, re-vegetation (floor, canopy), structure on piers.

In accordance with the Federal Water Pollution Control Act, the City is required to implement a Comprehensive Storm Management Program in order to reduce pollutants in urban runoff to the maximum extent possible.

Example 3. City of Folsom, Humbug/Willow Creek Parkway Plan

PP.8. Maximize opportunities for creating open space.

Example 1. City of Sacramento, Multi-Family Residential Design Principles

Residential Design Element: Open Space/Landscaping

Principle: Residential projects should be designed to maximize opportunities for creating usable attractive, and integrated open space. Page 13

Note: Street design (cross sections) shall be compatible with the City Street Design Manual. All new landscaping shall comply with the City of Sacramento Water Conservation Ordinance.

PP.9. Regulate development adjacent to waterways.

Example 1. City of Sacramento, Sacramento River Parkway Plan

Chapter 3 Goals and Policies

Sacramento River Parkway Goals page 30

- To recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control.
- To preserve, protect and enhance the natural and cultural resources of the Parkway.

General Policies page 31

G4 The Parkway is primarily a recreational, open space, educational, and water oriented resource.

Recreational Use Policies page 32

R3 Recreational activities which are hazardous or incompatible with Parkway natural habitat and uses, or detrimental to adjacent and surrounding habitat are prohibited.

R4 All recreational development including trails, signs, structures and fences shall be constructed to prevent erosion, protect the structural integrity of the levee, and blend harmoniously with the surrounding landscape.

Natural and Cultural Resource Policies page 39

N1 Although the Parkway is to be developed for human use, the natural environment shall be protected, preserved, and enhanced to the fullest extent possible, especially large aggregations of riparian vegetation and wildlife.

N2 Public access in Nature Study Areas may be limited if access negatively affects a habitat restoration project or a listed threatened or endangered species.

N3 Development within the Parkway, including trails and roads, signs, and structures, shall be designed to minimize impact to native vegetation.

N4 Areas designated for habitat restoration shall be planted with native or indigenous species.

N8 Endangered or threatened species and their habitat shall be protected from encroachment by designating the area as Riparian Habitat Preserve or nature Study.

Erosion Policies page 39

E1 Reduce indiscriminate foot and bicycle traffic on levee slopes by providing trails, fencing, and signage to channel traffic to key points.

E2 Avoid use of soil sterilents or herbicides over large areas as this would encourage surface erosion.

E3 Indigenous grasses and other native vegetation should be used stabilize the soil and reduce rain water runoff

Chapter 3 Goals and Policies

Natural and Cultural Resource Policies page 39

N1 Although the Parkway is to be developed for human use, the natural environment shall be protected, preserved, and enhanced to the fullest extent possible, especially large aggregations of riparian vegetation and wildlife.

Example 2. City of Sacramento, American River Parkway Plan

Chapter 2 Goals and Policies

GOALS page 2-1

- To provide, protect and enhance for public use a continuous open space greenbelt along the American River extending from the Sacramento River to Folsom Dam; and
- To preserve, protect, interpret and improve the natural, archaeological, historical and recreational resources of the Parkway, including and adequate flow of high quality water, anadromous and resident fishes, migratory and resident wildlife, and diverse natural vegetation;

POLICIES page 2-1

1.0 Parkway Concept

1.1 The American River Parkway is a unique regional feature which shall be managed to balance the goal of preserving naturalistic open space and environmental quality within the urban environment, with plans to provide recreational opportunity in the Sacramento area.

2.0 Resources of the Parkway page 2-2

2.1 Any development within the Parkway, including buildings, roads, parking lots and turfed areas, shall be designed and located such that any impact upon native vegetation is minimized, and appropriate mitigation measures are incorporated into the project.

2.2 Phased plans with short and long-term measures for the enhancement of native vegetation and the elimination of undesirable nonnative vegetation shall be developed and implemented.

2.6 Where appropriate, areas which have been damaged by mining, flooding, or other adverse conditions should be reclaimed for recreational use consistent with this Plan or restored to a naturalistic condition, as determined by the designated land use category.

3.0 Water Flows, Water Quality and Flood Control page 2-3

3.1 Water flow in the Lower American River should be maintained at adequate levels to permanently sustain the integrity of the water quality, fisheries, waterway recreation, aesthetics, riparian vegetation, wildlife, and other river-dependent features and activities

of the Parkway. The required flow levels of the Lower American River should be established at higher levels than those required under Decision 1400 of the State Water Resources Control Board. State and Federal Policy should provide for the maintenance of flows in the optimum range in the Lower American River.

3.3 Discharge or drainage of pollutants into the Lower American River shall be eliminated.

3.4 Levee protection and slope stabilization methods within the Parkway shall only be used when the Board of Supervisors determine that there is a demonstrated need to protect the health, safety and welfare of the community. The use of these methods shall result in minimal damage to riparian vegetation and wildlife.

Example 3. City of Folsom, Humbug-Willow Creek Parkway Plan

PP.10. Take advantage of opportunities presented by joint use facilities.

In many jurisdictions, existing recreational facilities may be designed to retain, or detain runoff requiring treatment from that area. Playing fields and parks may double as detention ponds and infiltration areas. Similarly, areas designated as ponds and infiltration areas may serve a dual role with landscaping requirements.

Example 1. City of Sacramento, Smart Growth Implementation Strategy, Page 1

Smart Growth Principles

2. *Take advantage of existing community assets emphasizing joint use of facilities (e.g. park and detention basin)*

Example 2. City of Sacramento, General Plan, Section 6 Conservation and Open Space Element

OUTDOOR RECREATION

Goal A

Conserve and protect the Sacramento and American Rivers, their shorelines and parkways. Page 6-16

Policy 2

Implement the goals and policies of the Sacramento River Parkway Plan, and amend the Plan to include updated information and recommendations from the Sacramento River Marina Carrying Capacity Study.

Policy 4

Work with the State to develop additional use of its open space areas at Cal Expo in a manner consistent with the American River Parkway Plan.

PP.11. Maximize use of pervious pavements.

Most auto-related uses require pavements. The use of pervious pavements can dramatically reduce impervious land coverage and minimize the creation of runoff. Pervious pavements are especially suitable for low-use parking areas, light use roadways, driveways, storage yards, and pedestrian areas. Pervious pavements include pervious concrete, porous asphalt, unit pavers on sand, crushed aggregate, and turf-block.

Example 1. City of San Jose, Draft Residential Design Guidelines

A. Minimization of Hardscape Areas

The hardscape or impervious areas of a site should be minimized in order to maximize permeable surfaces which absorb and biodegrade certain toxins. This will also reduce the volume of runoff into the storm drainage system.

1. For detached unit projects, hardscape areas in yard areas should utilize alternative surfaces such as raised wood decks, pavers, unmortared brick, stone or tile which allow absorption at joints and reduce runoff. Similar surface materials should be used for areas such as sideyards and entry walkways.
2. Multi-story buildings should be used rather than single-story buildings to reduce the building envelope size and maximize permeable surfaces.
3. Streets, driveways, and parking areas should be as small as possible within allowable standards.

PP.12. Maintain or establish open space requirements or buffer zones at creeks, create or preserve natural meanders.

Example 1. City of Palo Alto, Comprehensive Plan, Chapter 5, Natural Environment

The policy recognizes that activities beyond the riparian corridors can affect the integrity of the riparian area. The policy includes three programs:

1. Program N-7 adopts a 100-foot development setback, with some exceptions, from the top of the creek bank. The program also provides a border of native riparian vegetation at least 25 feet along the creek bank.
2. Program N-8 focuses on developing and adopting a creek ordinance.
3. Program N-9 focuses on regional planning efforts for a specific creek.

Example 3. City of Fairfield, Creekside Protection Plan

www.ci.fairfield.ca.us/city_code/chapter25/article_viii.htm

PP.13. Maintain surface and groundwater quality.

Example 1. City of Folsom General Plan, Open Space and Conservation Element

General Plan Policy 25.1.

The surface and groundwater quality of Folsom shall not be degraded from City standards.

PP.14. Maintain quality and quantity of surface and runoff water to existing flows and quantities.

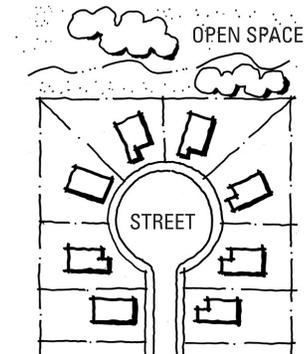
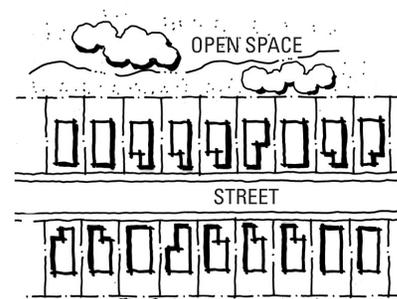
Example 1. City of Folsom General Plan, Open Space and Conservation Element

General Plan Policy 28.2

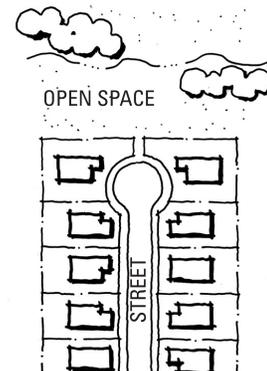
The quality and quantity of surface water runoff from a property shall not exceed existing flows or existing quality or shall comply with City standards for off-site drainage. The City shall implement a surface-runoff water quality monitoring program to insure compliance with City standards.

PP.15. Encourage public access and building orientation to open space; especially along creeks.

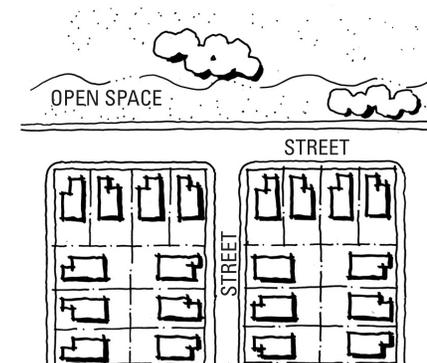
By encouraging public access and building orientation to creeks and open space, security is enhanced, and public understanding of riparian systems is increased. This reduces potential for dumping, illegal discharges, and crime. It also enables recreational uses and provides an important community amenity.



Discouraged: Residences should not back onto open space. This design limits access, reduces views, and minimizes maintenance and safety.



Acceptable: Residences can side onto open space while allowing access.



Preferred: Residences face the open space while allowing access and views.

PP.16. Develop hillside development ordinances to stipulate topographic sensitivity, setbacks, approval process

Example 1. City of Folsom, Hillside Development Ordinance

1. PURPOSE

The purpose of these Hillside Development Guidelines is to illustrate key design principles and issues which the Planning Commission, Architectural Review Commission and staff will use in evaluating applications for development of any site within those identified Hillside areas of the City. Significant hillside issues include street design, grading, site design, parking, drainage, architecture, landscaping, visual impact and preservation of natural features. Careful review and study of these issues is necessary to assure attractive developments which are sensitive to the surrounding environment.

The guidelines have been prepared to familiarize applicants with site design, architectural design and landscape design concepts encouraged by the City of Folsom and which will be applied by the Planning Department to evaluate compliance with the Hillside Ordinance.

2. INTRODUCTION

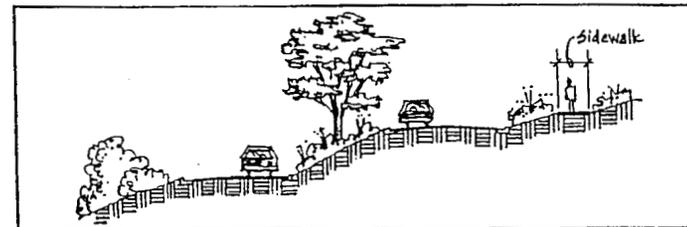
The majority of the hillside areas to which these guidelines will apply have been designated for single family development however, there may be opportunity for industrial and commercial development along the East Bidwell Street corridor north of Highway 50. For all areas, these Guidelines should be used in conjunction with the City-wide Design Guidelines, particularly for commercial and industrial development.

These Guidelines are based on principles established in the Hillside Development Procedures and Standards Ordinance (Ordinance No. 798). Where any inconsistency may occur, the language of the ordinance shall prevail.

3. STREET DESIGN

- a. Street systems should be established to permit safe and efficient travel for motor vehicles, bicycles, and pedestrians, yet ensure ready access for fire and emergency vehicles.
- b. Streets should be designed to reflect the type, density, scale, and character of hillside development. This will require sensitivity to grading, topography, existing vegetation, natural site features, and panoramic views. Alternative street designs require review by the Public Works and Planning Departments early in the design process.
- c. Streets should generally follow the natural contours of the lands and should not be placed perpendicular to contour lines, unless absolutely unavoidable. Curvilinear streets are preferred, but sharp curves should be avoided that will hamper emergency access.

- d. In order to reduce grading and allow for narrower residential streets, parking bays for guests and residents should be considered as an alternative to continuous curbside parking lanes. Parking lanes should not be included if the street does not provide direct access to abutting residences. However, parking bays may be needed for emergency turnouts or desired to provide parking at strategic vista points.
- e. Where traffic volume will be low, such as on loop or cul-de-sac streets, and where the street will not be a bus route, street width should be reduced in accordance with City standards to minimize grading and paving. Limiting the width will preserve and enhance the hillside setting and discourage speeding. Fire Department access shall always be maintained.
- f. Street design criteria may be reduced to promote slower traffic and to match existing contours while maintaining traffic safety. When ever feasible, a consistent design speed should be utilized for the entire street.
- g. A vertically offset or split-level road designed along a hillside slope is desirable where it would minimize grading, preserve an important site feature, or enhance the hillside setting.
- h. Arterial and collector streets should be designed to accommodate looped bus routes.
- i. Where possible, major developments should include a minimum of two vehicular access points. Public and emergency access to natural and common open space should also be provided.



Split-Level Street

PP.17. Assess pollution loads and flows as new master plans are proposed.

Example 1. City of Manteca, estimated impacts of changing land use from agriculture to residential

One of the principles of the permit is to “use existing drainage plans to estimate increases in loads and flows.” Workshop participants recognized an inherent difficulty in putting this principle into practice. Only one example was discovered during the preparation of this report.

CODES AND ORDINANCES

CO.1. Adopt smart growth codes and ordinances.

Example 1. City of Petaluma, Central Petaluma Specific Plan

SmartCode is a transect-based code used as an instrument to implement smart growth principles. The code enables and qualifies community patterns that include clustering, traditional neighborhood development, and transit-oriented development within a regional system. The code integrates standards and methods of environmental protection and open space conservation. The intent of the code is to encourage community development that is diverse, compact, and walkable. In addition, the code encourages the protection of landscapes that are ecologically and culturally valuable.

Petaluma, California became the first municipality in the US to adopt the SmartCode. The 55,000-population city in Sonoma County, north of San Francisco, sees the new code as its best route for regulating development in a 400-acre, mostly industrial, partly greenfield area in the community’s center.

<http://www.ci.petaluma.ca.us/cdd/cpsp.html>
www.smartcode.net

Example 2. The Local Government Commission has published a guide titled, “Overcoming Obstacles to Smart Growth through Code Reform”.

http://www.lgc.org/freepub/PDF/Land_Use/sg_code_exec_summary.pdf

CO.2. Adopt transit-oriented zoning codes and ordinances.

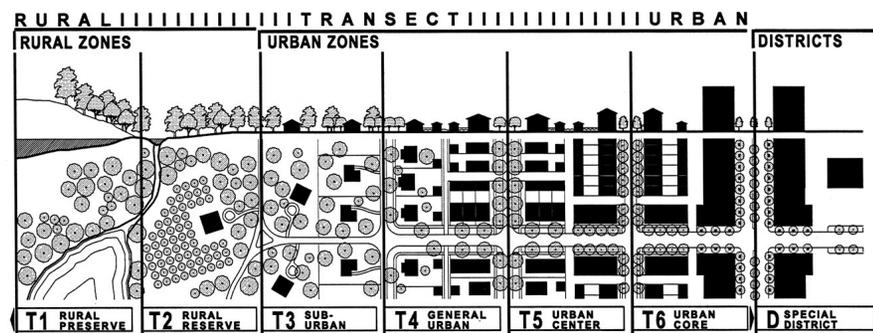
Example 1. City of Mountain View, San Antonio Station Precise Plan

http://www.ci.mtnview.ca.us/citydepts/cd/apd/san_antonio_station_uses.htm

Powerpoint Presentation

http://www.lgc.org/freepub/land_use/presentations/mtnview_sgcodes02/index.htm

3a THE TRANSECT SYSTEM ILLUSTRATED



CO.3. Adopt context-sensitive street design in zoning codes and ordinances.

See PP.5. for resources and examples (p. 7)

CO.4. Develop codes and ordinances to regulate property along wetlands and riparian corridors.

Example 1. County of Sacramento, Zoning Code, Parkway corridor combining zone

ARTICLE 3: (PC) PARKWAY CORRIDOR COMBINING ZONE**235-30. Purpose**

The Parkway Corridor (PC) Combining Zone as shown on the Comprehensive Zoning Plans shall be used to regulate property along the American River within the unincorporated area of the County. The goals promoted by establishment of this zone include:

- (a) Preserve and enhance the American River and its immediate environment consistent with the goals and policies of the American River Parkway Plan, an element of the Sacramento County General Plan.
- (b) Ensure, to the extent possible, the compatibility of land uses within the American River Parkway and land adjacent to the Parkway for their mutual benefit.
- (c) Ensure that development with access within and adjacent to the American River Parkway is designed to reduce as much as possible visible intrusion into the Parkway and to complement the naturalistic amenities of the Parkway.
- (d) Provide flexibility in development requirements such as setback, height, bulk and landscaping applicable to parcels of property subject to the regulations of the (PC) Parkway Corridor zone.
- (e) Minimize risks to public health, safety and welfare in areas which are potentially threatened by erosional processes.
- (f) Ensure that bluff development, including related storm runoff, foot traffic, site preparation, construction activity, irrigation and other activities and facilities accompanying such development, does not create or contribute significantly to problems of erosion or geologic instability on the site or on surrounding areas.
- (g) Ensure that bluff development is sited and designed to assure stability and structural integrity for its expected economic lifespan while minimizing alteration of natural landform features.
- (h) Ensure that development within the American River Parkway Corridor zone occurs in a manner which maintains a safe environment for homes and other improvements, and protects the aesthetic and environmental quality of the Parkway.

CO.5. Develop hillside development ordinances to stipulate topographic sensitivity, setbacks, approval process (see PP.16.)

Example 1. City of Folsom, Hillside Development Ordinance

Purpose

The purpose of the Hillside Development Guidelines is to illustrate key design principles and issues which the Planning Commission, Architectural Review Commission, and staff will use in evaluating applications for development of any site within those identified Hillside areas of the City. Significant hillside issues include street design, grading, site design, parking, drainage, architecture, landscaping, visual impact, and preservation of natural features. Careful review and study of these issues is necessary to assure attractive developments which are sensitive to the surround environment. The Guidelines have been prepared to familiarize applicants with site design, architectural design, and landscape design concepts encouraged by the City of Folsom and which will be applied by the Planning Department to evaluate compliance with the Hillside Ordinance.

CO.6. Author codes to reduce pollutants in stormwater.

Example 1. City of Sacramento, City Code, Stormwater Section

13.16.120 Reduction of pollutants in stormwater.

B. Development.

1. The enforcement official may develop controls as appropriate to minimize the long-term, post construction discharge of stormwater pollutants from new development(s) or modifications to existing development(s). Controls may include source control measures to prevent pollution of stormwater and/or treatment controls designed to remove pollutants from stormwater.
2. Any person performing construction in the city shall prevent pollutants from entering the stormwater conveyance system and comply with all applicable federal, state and local laws, ordinances or regulations including but not limited to the general permit for stormwater discharges associated with construction activity and the city grading, erosion and sediment control ordinance (City of Sacramento Ordinance No. 93-068).

CO.7. Stipulate legal authority to require source and treatment controls are given to agency head.

Example 1. The City of Sacramento's Stormwater Ordinance provides the legal authority to require source and treatment controls for new development/redevelopment. The ordinance states:

13.16.120 Reduction of pollutants in stormwater. B.1

B. Development.

1. The enforcement official may develop controls as appropriate to minimize the long-term, post construction discharge of stormwater pollutants from new development(s) or modifications to existing development(s). Controls may include source control measures to prevent pollution of stormwater and/or treatment controls designed to remove pollutants from stormwater.

2. Any person performing construction in the city shall prevent pollutants from entering the stormwater conveyance system and comply with all applicable federal, state and local laws, ordinances or regulations including but not limited to the general permit for stormwater discharges associated with construction activity and the city grading, erosion and sediment control ordinance (City of Sacramento Ordinance No. 93-068).

The entire ordinance can be found at www.sacstormwater.org (Stormwater Ordinances, Stormwater Management and Discharge Control).

STANDARDS & GUIDELINES

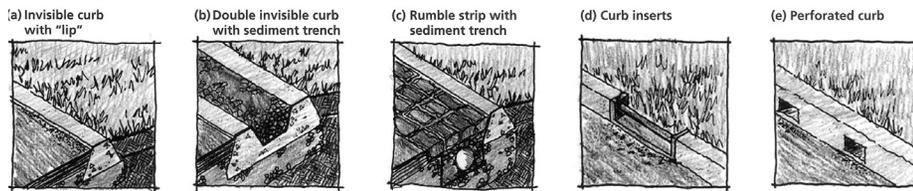
SG.1. Develop context-sensitive street standards and guidelines.

Example 1. Green Streets: Innovative Solutions for Stormwater and Stream Crossing, Portland Metro

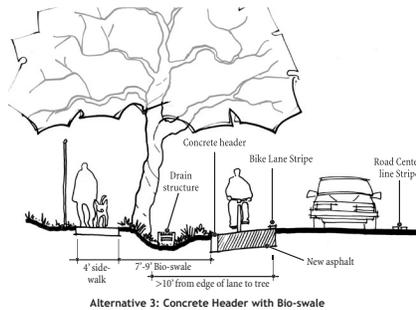
<http://www.metro-region.org/article.cfm?articleID=235>

Example 2. The Broadview Green Grid Project

<http://www.ci.seattle.wa.us/util/NaturalSystems/broadview.htm>



Details for street designs that incorporate stormwater infiltration.
Source: *Green Streets: Innovative Solutions for Stormwater and Stream Crossings, Portland Metro*



Street section with bio-swale and photograph of built example in Seattle, Washington.
Source: *Cunningham Avenue, San Jose (left), Broadview Green Grid Project website (right)*

Example 3. SmartCode, Duany Plater-Zyberk & Co., 2001

Smart Growth principles include street standards and guidelines to ensure that street widths support multiple goals of accommodating traffic, encouraging pedestrians, and improving environmental quality.

**SMARTCODE
SARASOTA**

6. STANDARDS & TABLES
7 OF 11 PAGES

6.8 STREETS CAPES TABLE (ALTERNATIVE 1)

6.8.1 Local Thoroughfare Types

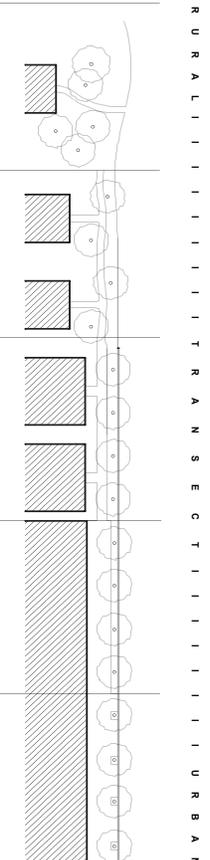
6.8.1.2 Rural Road (RR): a thoroughfare of low vehicular capacity without parking. Its streetscape characterized by open swales drained by percolation. Its landscaping consists of multiple tree and shrub species composed in naturalistic clusters. This type is permitted within Rural Zones (T1-T2) and Sub-Urban Zones (T3).

6.8.1.2 Road (RD): a thoroughfare of low and moderate vehicular capacity with yield parking. Its streetscape characterized by open swales drained by percolation and a walking path or bicycle trail along one or both sides. Its landscaping consists of multiple species composed in naturalistic clusters. This type is permitted within Sub-Urban (T3) and General Urban Zones (T4).

6.8.1.3 Street (ST): a thoroughfare of low and moderate vehicular capacity with parking on one or both sides. Its streetscape characterized by raised curbs drained by inlets and narrow sidewalks separated from the vehicular lanes by a wide continuous planter. Its landscape consists of street trees of a single or alternating pair of species, aligned in a regularly spaced allées. This type is permitted within General Urban (T4) and Urban Center Zones (T5).

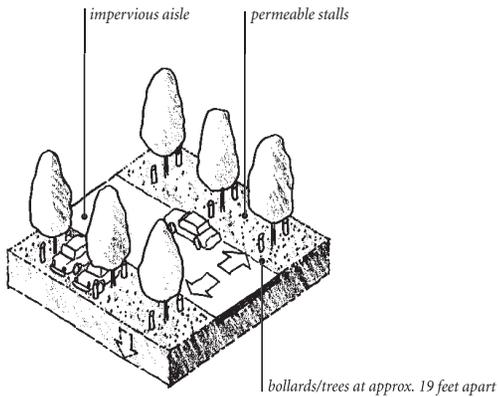
6.8.1.4 Urban Street (US): a thoroughfare of moderate vehicular capacity with parking on one or both sides. Its streetscape characterized by raised curbs drained by inlets and separated by wide sidewalks separated from the vehicular lanes by a narrow continuous planter. The landscaping consists of a single tree species aligned in a regularly spaced allées. This type is permitted within Urban Center (T5) and Urban Core Zones (T6).

6.8.1.5 Commercial Street (CS): a thoroughfare of moderate vehicular capacity with parking on both sides. Its streetscape consists of raised curbs drained by inlets and very wide sidewalks along both sides separated from the vehicular lanes by separate freewells with grates. The landscaping characterized by a single tree species aligned with regular spacing wherever possible but clearing the shop entrances. This type is permitted within Urban Center (T5) and Core Zones (T6).



SG.2. Develop parking standards requiring pervious paving.

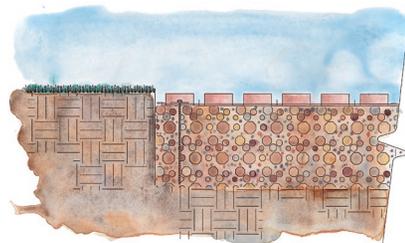
Example 1. Start at the Source, Design Guidance Manual for Stormwater Quality Protection, 1999 Edition



Pervious paving design diagram (left), pervious parking grove (Sonoma County, California) (middle left), GravelPave details (bottom left and right)

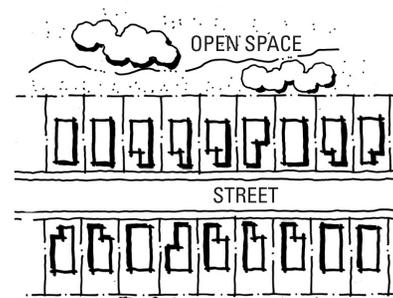


www.invisiblestructures.com

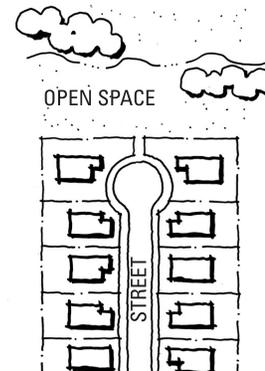
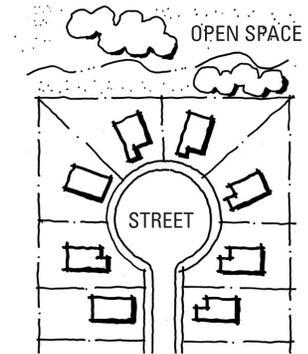


SG.3. Author standards to regulate the development adjacent to waterways.

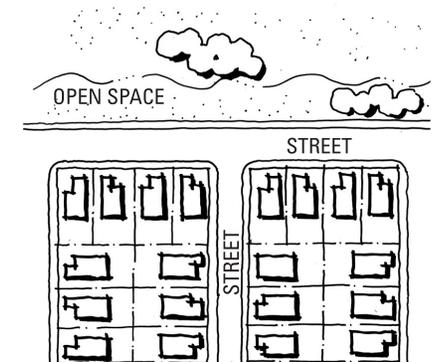
Example 1. Conceptual illustrations (below)



Discouraged: Residences should not back onto open space. This design limits access, reduces views, and minimizes maintenance and safety.



Acceptable: Residences can side onto open space while allowing access.



Preferred: Residences face the open space while allowing access and views.

SG.4. Incorporate BMPs in new and re-development and require them as a condition of approval for projects.

Example 1. California Stormwater Quality Association, Stormwater Best Management Practice Handbook, New Development and Redevelopment (CASQA BMP Handbook)

A partial list of relevant topics in the manual include:

- Stormwater Quality Planning for New Development and Redevelopment,
- Developing a Stormwater Management Plan,
- Identifying Candidate BMPs,
- Planning Principles,
- Site and Facility Design for Water Quality Protection,
- Source Control BMPs,
- Treatment Control BMPs, and
- Long-Term Maintenance of BMPs

www.casqa.org
www.cabmphandbooks.com

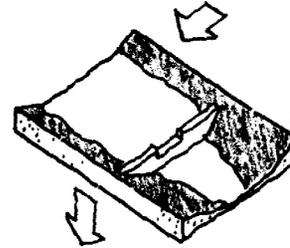
Example 2. City / County of Sacramento On-site Guidance Manual

www.sacstormwater.org

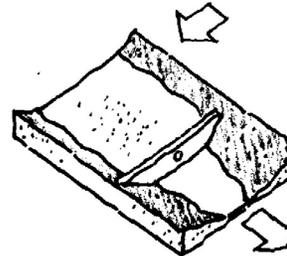
Example 3. Start at the Source, Design Guidance Manual for Stormwater Quality Protection, 1999 Edition

SG.5. Establish design standards for BMPs.

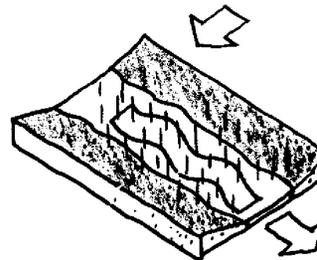
Example 1. See California Stormwater Quality Association, Stormwater Best Management Practice Handbook, New Development and Redevelopment



SG.6a. Infiltration basin



SG.6b. Retention / detention basin



SG.6c. Biofilter

SG.6. Develop a plant selection list to advise users.

It is desirable to have a list of appropriate plants for use in stormwater BMPs within Sacramento County. Other jurisdictions have developed similar lists for creekside or riparian areas.

Example 1. County of Sacramento Planting List

*Example 2. Marin County Stormwater Pollution Prevention Program,
<http://mcstoppp.org/Plants.htm>*

Appendix F

Technical Memorandum:

Review of Design Criteria for Stormwater
Quality Treatment Facilities for the
Sacramento Stormwater Management Program

Sacramento Stormwater Management Program

Review of Design Criteria for Stormwater Quality Treatment Facilities for the Sacramento Stormwater Management Program

Prepared for the Sacramento MS4 Permittees:

City of Citrus Heights
City of Elk Grove
City of Folsom
City of Galt
City of Sacramento
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Submitted: November 11, 2003

Technical Memorandum

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Section 1

Introduction

1.1 Background and Purpose

This draft technical memorandum has been prepared for the County of Sacramento and the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, and Galt (Sacramento MS4 Permittees) who discharge stormwater from municipal separate storm sewer systems under Waste Discharge Requirements Order No. R5-2002-0206 (Sacramento MS4 Permit) issued by the Regional Water Quality Control Board (RWQCB). The purpose of this technical memorandum is to review the numeric design criteria in current use by the Sacramento MS4 Permittees for sizing structural stormwater quality treatment best management practices (BMPs), or stormwater quality control measures, and to determine whether the criteria are compliant with the Sacramento MS4 Permit.

Currently, stormwater facilities must be designed according to City and County of Sacramento standards. The Sacramento County Water Resources Division and the City of Sacramento Department of Utilities Division of Engineering have jointly developed the hydrology design standards for the City and County, which are documented in *Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards* [Hydrology Standards] (Sacramento County Public Works Agency and City of Sacramento Department of Utilities and Public Work, 1996).

The Hydrology Standards provide a consistent basis for the analysis and engineering design of drainage facilities in the City and County of Sacramento. The Hydrology Standards also provide a method, called the Sato method, for estimating the storage volume required for the design of stormwater quality control detention basins. The Sato method, named after the engineering firm that developed it, was initially documented in a report published in 1991. The Sato Method was based on the precipitation records and technology available at the time. The Sato method is generally intended to size regional-sized water quality stormwater detention basins.

The City of Sacramento defines regional stormwater quality control measures as being for drainage areas of 100 acres or greater (City of Sacramento Department of Utilities and Public Work, 2000). These measures are typically built to receive and treat stormwater discharges from multiple upstream developments.

Measures for smaller drainage areas are called on-site measures and are typically constructed to treat stormwater discharges from a single upstream development. Currently, these stormwater quality control measures should be designed using the *Guidance Manual for On-Site Stormwater Quality Control Measures* [On-Site Guidance Manual] (Sacramento County Public Works Agency and City of Sacramento Department of Utilities and Public Work, 2000).

Recently, the Central Valley Regional Water Quality Control Board (RWQCB) issued an MS4 Permit that includes very specific requirements for volume- and flow-based numeric sizing criteria for designing structural stormwater quality control measures. The new Sacramento MS4 Permit was written to comply with the State Water Resources Control Board's (SWRCB) Water Quality Order 2000-11. The purpose of this technical memorandum is to:

- Review and update, if necessary, the current Sato method using more recent precipitation records and software
- Compare the Sato method design criteria to the criteria listed in the Sacramento MS4 Permit and recommend changes, if necessary
- Compare the On-Site Guidance Manual design criteria to the criteria listed in the Sacramento MS4 Permit and recommend changes, if necessary

1.2 Permit Requirements

The Sacramento MS4 Permittees received their third NPDES stormwater permit from the RWQCB in December 2002. This permit includes very detailed and specific requirements for a Development Standards Plan (DSP). The DSP is required to describe stormwater quality control measures that each permittee will undertake to reduce pollutant discharges to the maximum extent practicable (MEP) from all new development and significant redevelopment projects.

The Sacramento MS4 Permittees are required to develop and submit a DSP that will meet the provisions outlined in the Waste Discharge Requirements Order No. R5-2002-0206 (Sacramento MS4 Permit).

The specific conditions for the numeric sizing criteria are outlined in Section C.19.c of the 2002 Sacramento MS4 Permit as follows:

C.19.c. Numeric Sizing Criteria: As a part of the DSP, the Permittees shall review their existing numeric sizing criteria for structural treatment BMPs [best management practices] and ensure that it is [sic] comparable to the following numeric sizing criteria:

i. Volume-based BMPs shall be designed to mitigate (infiltrate or treat) either:

- a) The volume of runoff produced from a 24-hour 85th percentile storm event as determined from the local historical rainfall record; or*
- b) The volume of runoff produced from a 24-hour 85th percentile rainfall event determined as the maximized capture storm water volume for the area, from the formula recommended in Urban Runoff Quality*

Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or

- c) *The volume of annual runoff based on unit basin storage volume, [sic] to achieve 80 percent or more volume treatment by the method recommended in the California Storm Water Best Management Practices Handbook - Industrial/Commercial, (1993)“*

ii. Flow-based BMPs shall be designed to mitigate (infiltrate or treat)

either:

- a) *The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two, or*
- b) *The maximum flow rate of runoff, as determined from local historical rainfall records, that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.*

1.3 Scope of Work

The scope of work included the following key tasks:

- Review the Sato method design criteria and assess relative advantages and disadvantages of utilizing the Sato design criteria versus more recent design criteria presented in other sources, including the 2003 *California Stormwater Best Management Practices Handbook* [2003 California BMP Handbook] (California Stormwater Quality Association, 2003), which replaces the 1993 version listed in the Sacramento MS4 permit, and the numeric sizing criteria allowed under Section C.19.c of the Sacramento MS4 Permit.
- Compare the precipitation statistics for the period 1963 through 1990 versus 1963 2002 and update the relevant precipitation statistics for comparison
- Meet with City and County staff to present and discuss findings of the comparisons prior to updating the Sato curve
- Proceed with the update using the most recent precipitation records if the decision is made to retain the Sato method
- Review the numeric BMP (stormwater quality control measure) design criteria from the On-Site Guidance Manual with respect to the alternative requirements presented under Section C.19.c of the Sacramento MS4 Permit and with respect to the results of the review of the Sato method

- Confer with the local agency staff to define technically acceptable approaches for defining numeric sizing criteria

Section 2

Review of Design Criteria for Structural Stormwater Quality Control Measures

2.1 Comparison of Precipitation Statistics for the Sato Method

The Sato method is documented in the *Optimization of Stormwater Quality Enhancement by Detention Basin for the Sacramento Metropolitan Area* [Sato report] (J.F. Sato and Associates, 1991) and is based on an analysis of long-term precipitation records that approximates a continuous simulation model. Sato separated the hourly precipitation records from approximately 27 years into discrete storm events. A series of hourly precipitation records was considered to be a single storm event if it was separated by dry weather (zero precipitation) for a specified minimum interevent duration, or storm separation time. In the Sato report, three minimum interevent duration thresholds, 12, 24, and 48 hours, were used to produce three sets of long-term precipitation statistics. These three minimum interevent durations also correspond to the draw down time of the stormwater quality detention basins. However, the Sato design curve presented in the Hydrology Standards is for a storm separation time of 24 hours only.

For the storm separation analysis, Sato analyzed precipitation records from a single gage, the Sacramento Gage #047633, for the period of record from 1963 to 1990. Once the hourly precipitation records were separated into individual storm event totals, 0.1 inch was subtracted from each storm event to account for depression storage and other precipitation losses during the event. A storm event was removed from the analysis if the total precipitation of the event was less than or equal to 0.1 inch. The mean and standard deviation statistics were calculated for each minimum interevent duration (12, 24, and 48 hours) for:

- Total event precipitation (inches),
- Storm event duration (hours), and
- Actual dry period (zero precipitation) between events (hours).

Following this same methodology, CDM prepared precipitation statistics for the Sacramento Gage #047633 for three periods:

- 1936 to 2002 (all available hourly records)
- 1963 to 1990 (the period of record used in the Sato analysis)

■ 1963 to 2002

The statistics were computed using a software program developed by CDM called NetSTORM. The precipitation statistics prepared by CDM are presented in Table 1 along with those prepared by Sato.

As can be seen in Table 1, the precipitation statistics prepared by CDM and Sato for the different periods of record are virtually the same. The statistics for the period from 1963 to 1990 for both authors are nearly identical for all statistics and for all storm separation durations. The mean precipitation for the 12-hour storm separation duration varied by 0.01 inch, or approximately 1 percent. This small difference is likely due to a slight difference in the period of records analyzed.

The statistics prepared by Sato for the period of 1963 to 1990 and those prepared by CDM for the periods of 1936 to 2002 and 1963 to 2002 were nearly as similar, but had some small differences in the statistics of time intervals between events. This comparison of statistics indicates that any of the three periods would yield virtually the same Sato stormwater quality basin design curve.

Table 1
Rainfall Statistics of the Sacramento Area, California (Gage #047633)

(a) 1963 - 1990 (Sato)

Storm Separation Time (hours)	Number of Storms	Precipitation (inches)		Duration (hours)		Dry Period Between Events (hours)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
12	676	0.72	0.76	13.58	16.19	208.8	425.6
24	593	0.82	0.92	20.27	25.53	251.6	459.8
48	464	1.06	1.25	39.72	52.72	328.7	513.8

(b) 1963 - 1990 (CDM)

Storm Separation Time (hours)	Number of Storms	Precipitation (inches)		Duration (hours)		Dry Period Between Events (hours)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
12	676	0.71	0.76	13.55	16.18	211.5	435.7
24	593	0.82	0.92	20.25	25.51	255.0	471.0
48	464	1.06	1.25	39.63	52.72	332.9	526.4

(c) 1963 - 2002 (CDM)

Storm Separation Time (hours)	Number of Storms	Precipitation (inches)		Duration (hours)		Dry Period Between Events (hours)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
12	997	0.72	0.75	13.99	16.31	208.9	462.0
24	869	0.84	0.91	21.16	26.73	254.2	502.9
48	671	1.09	1.32	41.41	58.06	333.6	566.5

(d) 1936 - 2002 (CDM)

Storm Separation Time (hours)	Number of Storms	Precipitation (inches)		Duration (hours)		Dry Period Between Events (hours)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
12	1686	0.72	0.77	13.77	16.16	207.6	453.7
24	1445	0.85	0.97	21.33	27.91	255.0	495.7
48	1137	1.09	1.33	40.15	57.17	328.5	553.4

2.2 Comparison of the Sato Method and Other Design Criteria Allowable Under the NPDES Permit

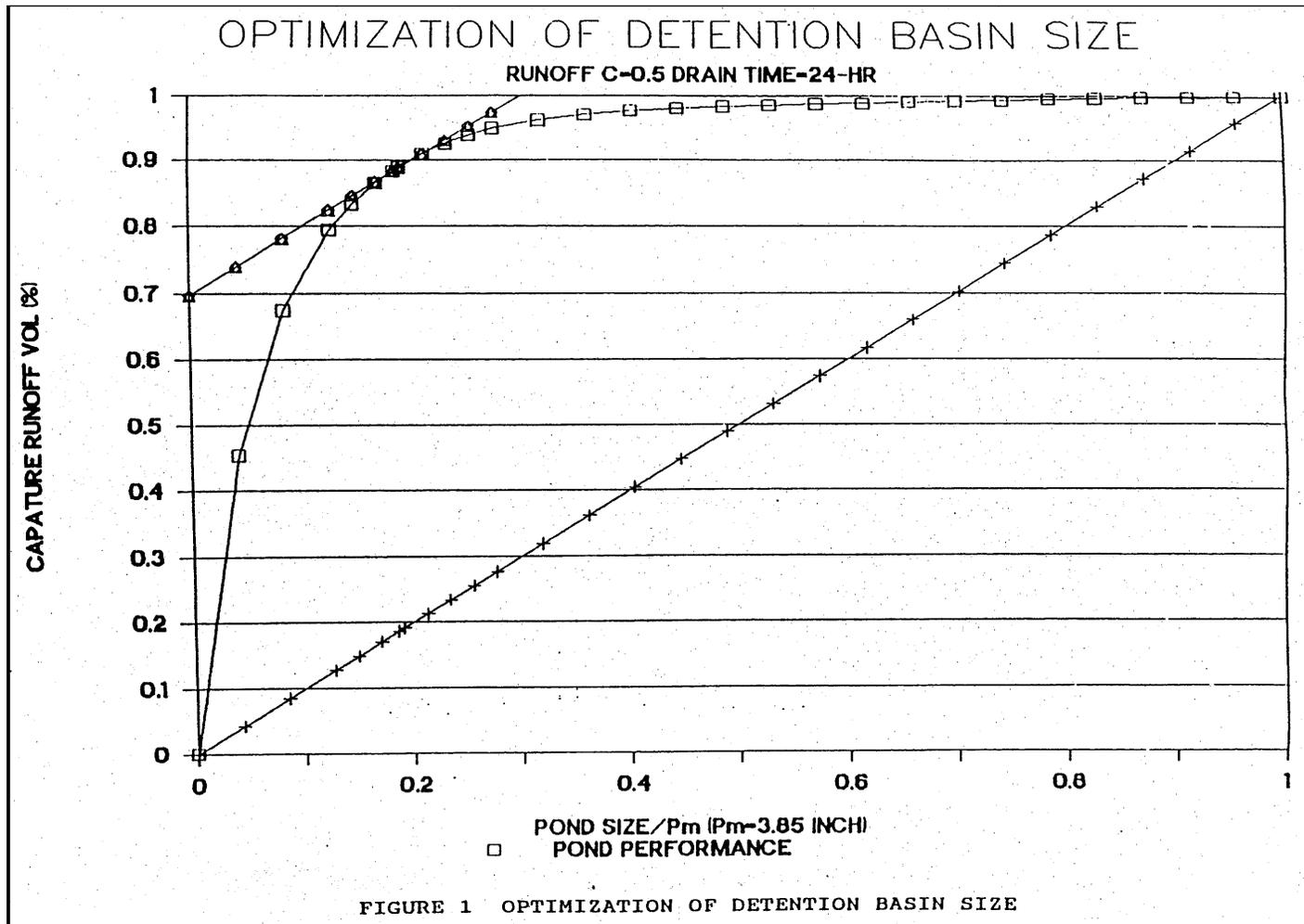
The Sato report presents a method to optimize the treatment capture design volume of stormwater quality detention basins in the Sacramento metropolitan area. Treatment of stormwater pollutants is based on the percentage of the total volume of stormwater that is captured by the basin and treated over a long period of time. A high percentage of the total stormwater runoff volume over time may be collected if the basin is designed to capture and treat many small, more frequent storm events. The Sato method uses a capture-curve technique to estimate the optimum detention basin design volume.

An example of a capture curve from the Sato report is shown in Figure 1. To develop this curve, the storm events described in Section 2.1 were converted to runoff volumes for each storm event using a runoff coefficient, or *C*-value, which corresponds to a particular land use or land cover. These runoff volumes were then compared to a detention basin with an assumed design volume capacity, and an overflow volume was calculated for each storm event. Under this method, the detention basin was assumed to release treated runoff at the design rate during the duration of the storm. Once the overflow was calculated for all storms in the period of record for a particular detention basin design volume capacity, the capture rate was computed for the entire period for that design volume. The curve in Figure 1 represents the results of application of this procedure for various detention basin design volume capacities for a watershed with a particular percent imperviousness, corresponding to a runoff coefficient (*C*-value) equal to 0.5.

As can be seen on Figure 1, the percent of long-term stormwater volume capture percentage increases rapidly at first with a small increase in detention design volume capacity. However, as the design volume capacity increases, the capture percentage only increases slightly. This point on the curve where the capture percentage starts to increase at a slower rate is called the “knee of the curve” and is considered to be the optimum design volume capacity. The Sato report summarized these optimized basin storage volumes for various percentages of imperviousness (*C*-values) and for storm separations of 12, 24, and 48 hours in a set of design curves, as shown in Figure 2. The Sato design curve that was incorporated into the Hydrology Standards is for the 24-hour storm separation duration only. As noted in Section 2.1, this would correspond to a 24-hour draw down period for detention basins.

Table 2 presents a summary of the features of the Sato method and provides a comparison of the Sato method with other stormwater quality control measures design methods allowed under the Sacramento MS4 Permit. Tables 3 and 4 present comparisons of the results of using the various design methods for storm separations of 24 and 48 hours. Comparisons of the Sato method and the other design criteria are described below.

Figure 1
Example Capture Curve (Open Squares) from the 1991 Sato Report



Legend

■ Normalized Volume Capture Curve	+ Normalized Pond Size Equals Runoff Volume Capture Percentage	◇ Tangent Line to Capture Curve with Slope of Normalized Pond Size Equaling Runoff Volume Capture Percentage
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Figure 2
Sato Design Curves from the 1991 Sato Report

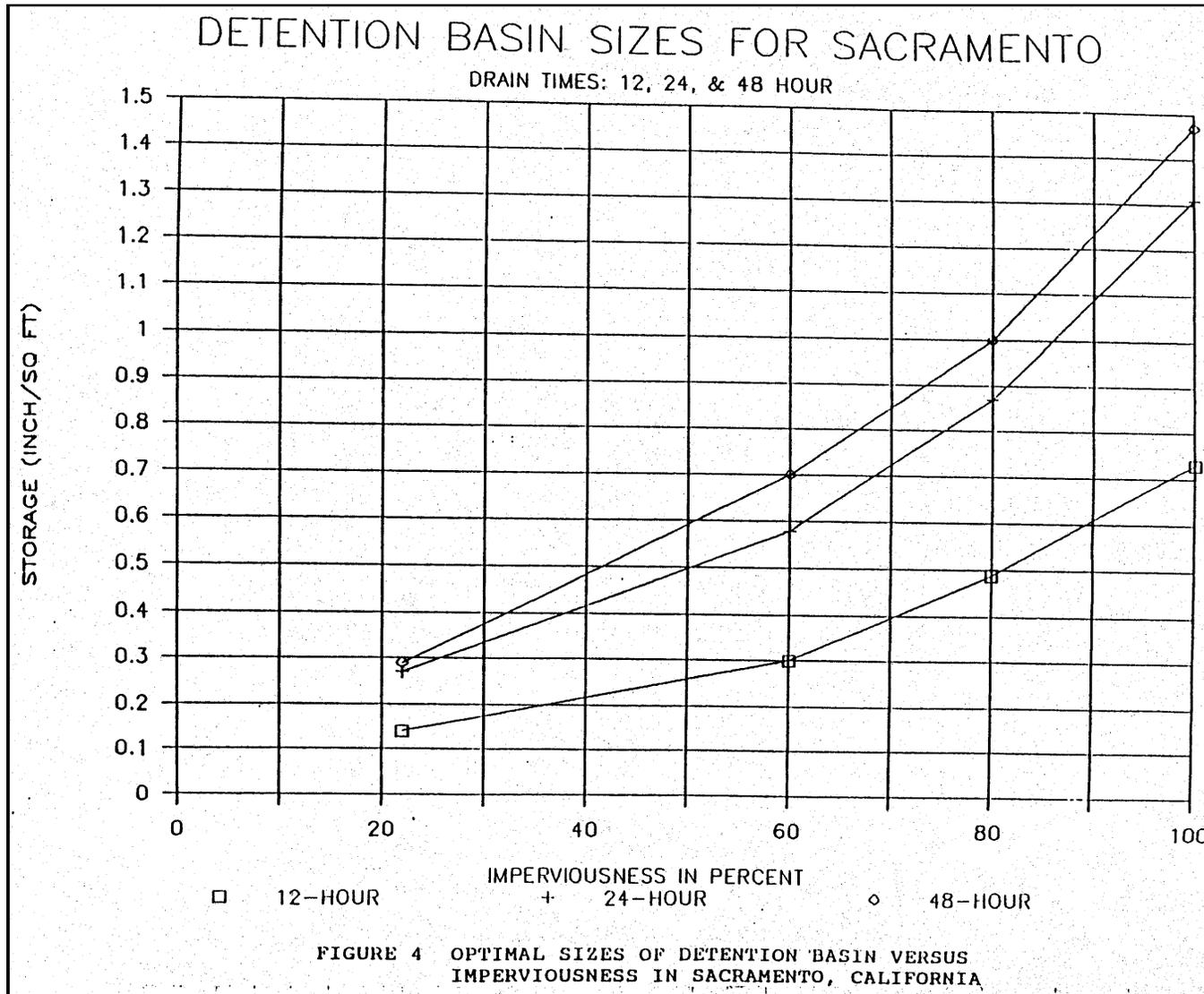


Table 2
Comparison of Volume-Based Design Criteria for Stormwater Quality Detention Basins

Characteristic	Sato Method	CASQA Method	WEF/ASCE Method	85th Percentile Method	On-Site Guidance Manual Method
Design Criteria					
Approach	<ul style="list-style-type: none"> ■ Capture curve 	<ul style="list-style-type: none"> ■ Capture curve 	<ul style="list-style-type: none"> ■ Regression equation of capture curves 	<ul style="list-style-type: none"> ■ Design storm 	<ul style="list-style-type: none"> ■ Design storm
Design Point	<ul style="list-style-type: none"> ■ Knee of capture curve 	<ul style="list-style-type: none"> ■ Near knee of capture curve ■ Ranges from 75 to 85 percent; 80 percent capture rate assumed 	<ul style="list-style-type: none"> ■ Knee of capture curve 	<ul style="list-style-type: none"> ■ Volume of runoff from a 24-hour, 85-percentile storm event 	<ul style="list-style-type: none"> ■ First 0.5 inch of runoff
Design Volume Selection	<ul style="list-style-type: none"> ■ One summary curve of knees of capture curves; select percent imperviousness 	<ul style="list-style-type: none"> ■ Series of capture curves ■ Select 80 percent capture rate and runoff coefficient curve ■ Curves for intermediate runoff coefficients must be interpolated 	<ul style="list-style-type: none"> ■ Set of equations and precipitation chart ■ Calculate runoff coefficient and select mean precipitation, ■ Calculate design volume 	<ul style="list-style-type: none"> ■ Permittee would need to develop methods for conversion from precipitation depths to design runoff volumes for various conditions 	<ul style="list-style-type: none"> ■ Constant 0.5 inch for all conditions ■ Multiply 0.5 inch by contributing area
Recommended Draw Down Time	<ul style="list-style-type: none"> ■ 40 to 48 hours; 75 percent within 24 hours 	<ul style="list-style-type: none"> ■ 48 hours in most areas of Cal.; < 72 hours; 50 percent within 24 hours 	<ul style="list-style-type: none"> ■ 24 to 48 hours recommended 	<ul style="list-style-type: none"> ■ None recommended 	<ul style="list-style-type: none"> ■ Unspecified
Performance					
Volume Capture Rate	<ul style="list-style-type: none"> ■ Varies between 87 and 89 percent 	<ul style="list-style-type: none"> ■ Constant 80 percent 	<ul style="list-style-type: none"> ■ Varies between 82 and 88 percent 	<ul style="list-style-type: none"> ■ Unspecified 	<ul style="list-style-type: none"> ■ Unspecified
Comparative Design Volume (inches) at C=0.6 and 24-Hour Draw Down	<ul style="list-style-type: none"> ■ 0.87 	<ul style="list-style-type: none"> ■ 0.30 	<ul style="list-style-type: none"> ■ 0.54 	<ul style="list-style-type: none"> ■ Unspecified 	<ul style="list-style-type: none"> ■ 0.5
Hydrology/Basin Routing					
Statistics	<ul style="list-style-type: none"> ■ Storm event separation technique 	<ul style="list-style-type: none"> ■ Storm event separation technique 	<ul style="list-style-type: none"> ■ Storm event separation technique 	<ul style="list-style-type: none"> ■ Unspecified 	<ul style="list-style-type: none"> ■ Unspecified
Travel Time of Runoff					<ul style="list-style-type: none"> ■ Neglected
Area Reduction Factor					<ul style="list-style-type: none"> ■ Not applicable

Table 2 (Continued)
Comparison of Volume-Based Design Criteria for Stormwater Quality Detention Basins

Characteristic	Sato Method	CASQA Method	WEF/ASCE Method	85th Percentile Method	On-Site Guidance Manual Method
Hydrology/Basin Routing (continued)					
Gage Used	■ Sacramento Gage (047633)	■ Sacramento Gage (047633)	■ Unspecified	■ Unspecified	■ Unspecified
Period of Record Used	■ 1963-1990	■ 1936-2002	■ Unspecified	■ Unspecified	■ Unspecified
Minimum Interevent Time Duration	■ 24 hours for Sato curve (12 and 48hours available in Sato Report)	■ 24 and 48 hours	■ 6 hours	■ Unspecified	■ Not applicable
Effective Precipitation	■ Initial abstraction 0.1 inch per storm event; constant rate loss neglected	■ Depression storage losses of 0.06 inch/hour; evaporation of 0.15 inch/day; constant rate loss neglected	■ 0.1 inch precipitation for a storm to produce incipient runoff	■ Unspecified	■ Unspecified
Runoff Volume Calculation	■ Runoff coefficient multiplied by effective precipitation	■ Runoff coefficient multiplied by effective precipitation (STORM program)	■ Runoff coefficient multiplied by effective precipitation (STORM program)	■ Unspecified	■ Unspecified
Reference for Runoff Coefficient	■ 1983 EPA Nationwide Urban Runoff Program (NURP)	■ CA BMP Handbook (no reference listed)	■ 1983 EPA Nationwide Urban Runoff Program (NURP)	■ Unspecified	■ Not applicable
Depth of Water in Pond at Beginning of Storm	■ Empty	■ Empty	■ Empty	■ Unspecified	■ Unspecified
Release Rate During Storm Event	■ Average rate of basin volume divided by draw down time	■ Average rate of basin volume divided by draw down time	■ Unspecified	■ Unspecified	■ Unspecified
Applicability of Criteria					
Watershed Area	■ <640 acres	■ >5 acres, <100 acres	■ <640 acres	■ Unspecified	■ <50 acres

Table 3
Comparison of Design Volumes Calculated for Stormwater Quality Detention Basins
Using Various Criteria—24-Hour Separation Interval

Variable	Sato Method	CASQA Method	WEF/ASCE Method	85th Percentile Method
<i>Runoff Coefficient</i>	0.2	0.2	0.2	Not Available
Volume Capture Rate Percentage	87	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	0.27	0.11	0.18	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-59	-33	Not Applicable
<i>Runoff Coefficient</i>	0.4	0.4	0.4	Not Available
Volume Capture Rate Percentage	89	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	0.58	0.2	0.36	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-66	-38	Not Applicable
<i>Runoff Coefficient</i>	0.6	0.6	0.6	Not Available
Volume Capture Rate Percentage	88	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	0.87	0.30	0.54	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-66	-38	Not Applicable
<i>Runoff Coefficient</i>	0.9	0.9	0.9	Not Available
Volume Capture Rate Percentage	89	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	1.31	0.46	0.81	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-65	-37	Not Applicable

Table 4
Comparison of Design Volumes Calculated for Stormwater Quality Detention Basins
Using Various Criteria—48-Hour Separation Interval

Variable	Sato Method	CASQA Method	WEF/ASCE Method	85th Percentile Method
<i>Runoff Coefficient</i>	0.2	0.2	0.2	Not Available
Volume Capture Rate Percentage	76	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	0.29	0.17	0.22	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-41	-24	Not Applicable
<i>Runoff Coefficient</i>	0.4	0.4	0.4	Not Available
Volume Capture Rate Percentage	81	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	0.70	0.3	0.45	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-57	-38	Not Applicable
<i>Runoff Coefficient</i>	0.6	0.6	0.6	Not Available
Volume Capture Rate Percentage	81	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	1.00	0.42	0.67	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-58	-33	Not Applicable
<i>Runoff Coefficient</i>	0.9	0.9	0.9	Not Available
Volume Capture Rate Percentage	80	80	Not Available	Not Available
Design Unit Pond Volume (in. per unit area)	1.47	0.66	1.01	Not Available
Percent Difference in Design Volume Compared to Sato Method	Not Applicable	-55	-31	Not Applicable

2.2.1 Volume-Based Versus Flow-Based Design Criteria

The Sato method is used to optimize the total volume of stormwater that is captured over a long period of time by a stormwater quality control detention basin. That is, it is a volume-based method of design. This approach is appropriate for measures such as inline structural detention basins.

However, for other types of measures, a flow-based design is appropriate; that is, the measure is designed to handle a certain peak flow. For example, a vegetative swale is one that uses a flow-based design. Still other measures must have a volume-based and a flow-based design. A common example of such a case is an off-line detention basin (extended dry basin). For an off-line detention basin, the volume of the basin is designed using volume-based criteria, and the diversion structure that diverts water from the main channel to the basin is designed using flow-based criteria. The Sato method only provides criteria for the volume-based design and does not provide any criteria for the flow-based design.

Therefore, the comparisons below between the Sato method and the other design criteria are only for the volume-based design criteria. Flow-based design criteria is discussed in Section 2.3 for the comparison of the design criteria of the On-Site Guidance Manual and the criteria listed in the Sacramento MS4 Permit.

2.2.2 Comparison of the Sato Method and the CASQA Method

The design criteria in the 2003 California BMP Handbook and the Sato Method are similar methods. The two criteria are compared in Table 2. Like the Sato Method, the method published by the California Stormwater Quality Association (CASQA method) in the California BMP Handbook is a knee-of-the-capture curve approach. Figures 3 and 4 show the design capture curves from the 2003 California BMP Handbook for the Sacramento 5 ESE gage (or #047633) for the 24- and 48-hour storm separation durations, respectively. These capture curves are for various runoff coefficients (C -values) and have similar shapes as those for the Sato method.

One of the main differences with the CASQA method is that the designer must interpolate between curves for C -values not shown, leaving more opportunity for interpretation. Another significant difference is that the California BMP Handbook recommends design of detention basins for an 80 percent capture rate for all conditions, which, in general, is close but not necessarily at the knee of the curve. As shown in Tables 3 and 4, this approach results in volume capture rates that are usually lower than those resulting from the Sato method.

Based on the comparisons presented in Table 3 and 4, the CASQA method generally yields unit basin design volume capacities (depth per unit of watershed area) that are more than 50 percent lower than the Sato Method at the same C -value. These results are unexpected because the methods employ very similar approaches. However, the

Sato method, although yielding larger design volume capacities, does comply with the CASQA method.

Figure 3
Capture Curves for the Sacramento Gage from the 2003 California BMP Handbook--24-Hour Drawdown

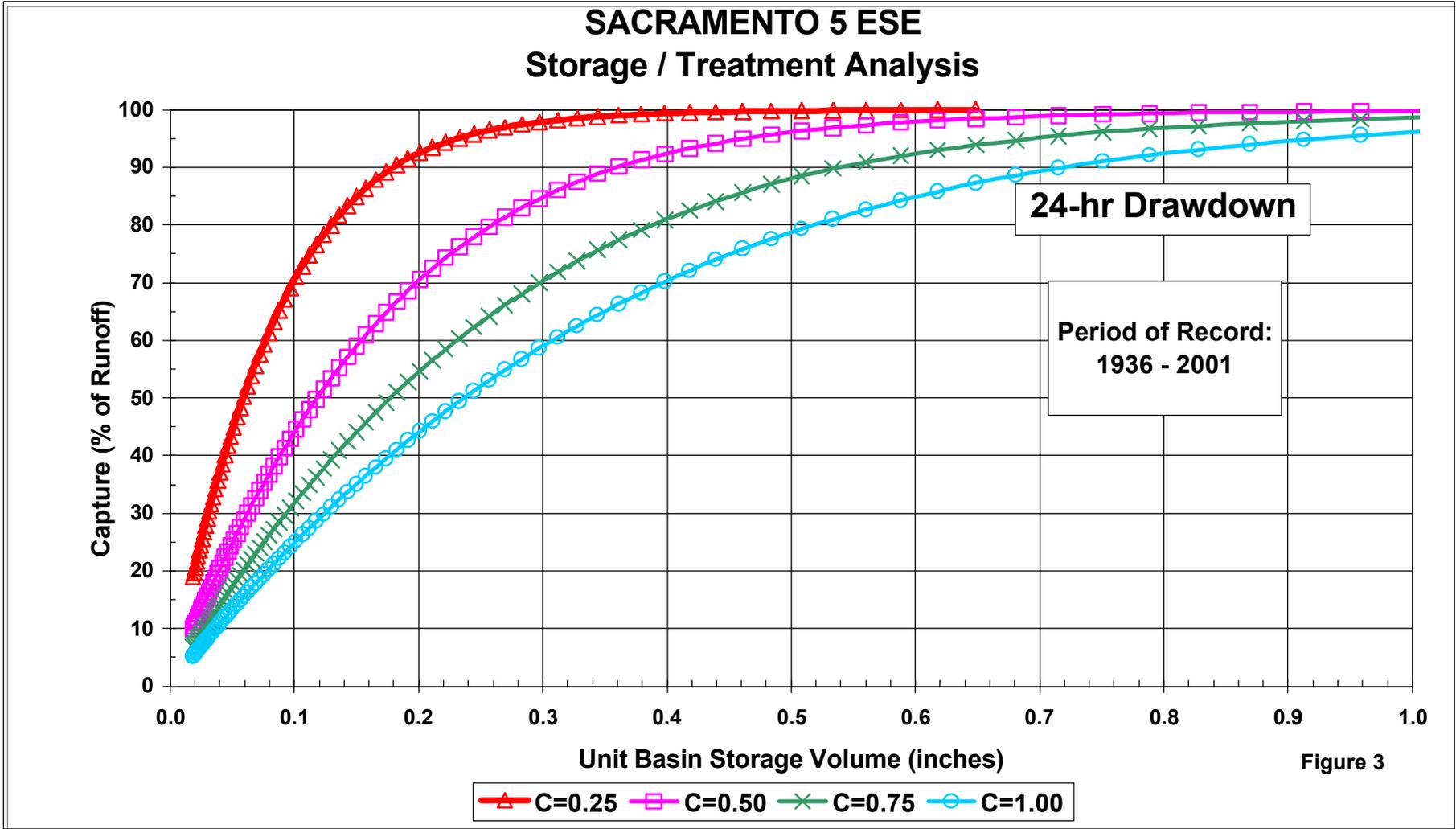
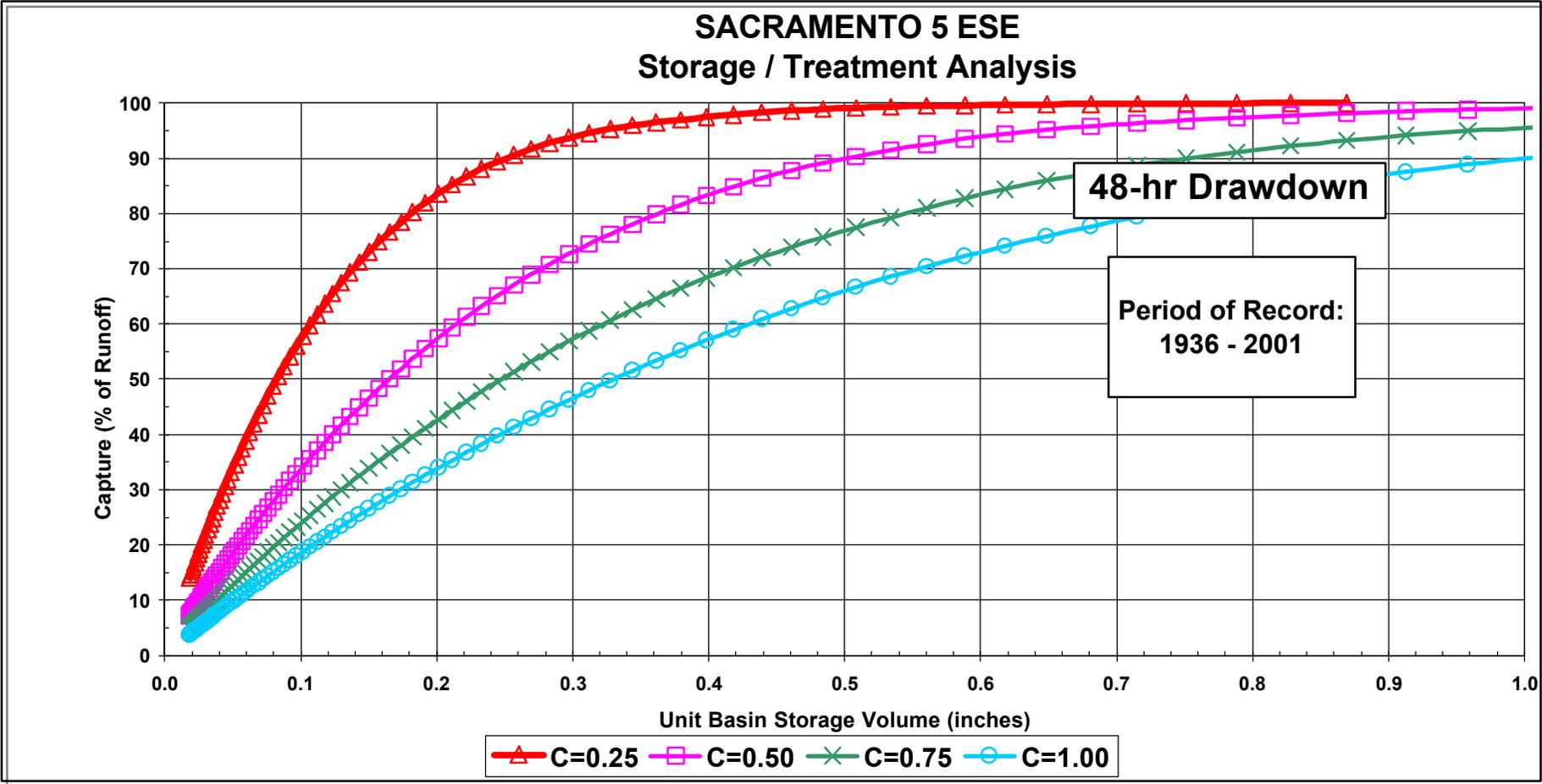


Figure 3

Figure 4
Capture Curves for the Sacramento Gage from the 2003 California BMP Handbook--48-Hour Drawdown



2.2.3 Comparison of the Sato Method and the WEF/ASCE Method

The design criteria in the Water Environment Federation/American Society of Civil Engineers (WEF/ASCE) manual of practice *Urban Runoff Quality Management* (Water Environment Federation and American Society of Civil Engineers, 1998) are similar to those of the Sato method. The two criteria are compared in Table 2. The WEF/ASCE method is based on a knee-of-the-capture curve approach. However, using this method, stormwater detention basin design volumes are not selected from the original capture curves. Instead, a set of regression equations was developed for the optimal capture rates from capture curves developed for different meteorological regions of the United States. The equations are based on a *C*-value, a regression coefficient that depends on the draw down time of the basin, and the mean storm precipitation depth, all of which are provided in the manual. This method is easy to use but may not be as accurate of a method, such as the Sato method, that is developed with precipitation data specifically from the study area. As shown in Tables 3 and 4, the long-term runoff volume capture rate for this method cannot be obtained from the equations but should be in the same range as for the Sato method.

Tables 3 and 4 present a comparison of the results of using the Sato method and the WEF/ASCE method for storm separations of 24 and 48 hours, respectively. For the same *C*-value, in general, use of the WEF/ASCE method generally yields unit basin design volume capacities (depth per unit of watershed area) that are approximately one third lower than those computed using the Sato method. These results are unexpected because the methods are so similar. The cause of this difference has not been identified. However, the Sato method, although yielding larger design volume capacities, does comply with the WEF/ASCE method.

2.2.4 Comparison of the Sato Method and the Volume-Based 85th Percentile Method

Using the design criteria listed in Section C.19.c.i.a of the Sacramento MS4 Permit (85th Percentile method), a detention basin would be designed to capture and treat the volume of runoff produced from a 24-hour, 85th percentile storm event as determined from the local historical precipitation record. This method is different than the Sato method. The two criteria are compared in Table 2.

Whereas the Sato method is based on overall volume captured over a long period of time, the 85th Percentile method is based on capturing a single storm event. However, design for this size storm event has been reported to yield an 80 percent volume capture rate for other areas. This design precipitation would need to be developed for the Sacramento area. Therefore, the capture rate and design volume that would result from using the 85th Percentile method is unknown. Also, the 85th Percentile method does not specify a hydrologic method to convert from precipitation depth to runoff volume; one would need to be developed by the Sacramento MS4 Permittees. More

analysis would need to be done to determine if the Sato method complies with the 85th Percentile method.

2.3 Comparison of the Design Criteria Guidance Manual and Other Design Criteria Allowable Under the NPDES Permit

The City and County of Sacramento provide design guidance for on-site stormwater quality control measures in the *Guidance Manual for On-Site Stormwater Quality Control Measures* [On-Site Guidance Manual] (Sacramento County Public Works Agency and City of Sacramento Department of Utilities and Public Work, 2000). The On-Site Guidance Manual defines on-site stormwater quality control measures as being for drainage areas of 100 acres or less. The On-Site Guidance Manual provides general design criteria for both volume-based and flow-based design. Volume-based stormwater control measures are designed using the water quality volume (WQV), which the manual defines as the first one-half inch of runoff. Flow-based stormwater control measures are designed using the water quality flow (WQF), which the manual defines as the peak flow rate of runoff associated with the 2-year, 6-hour storm event. Approved stormwater quality control measures designed with volume-based criteria are sand filters, infiltration trenches and basins, and porous paving blocks. The approved stormwater control measure designed with flow-based criteria is the vegetative swale. The On-Site Guidance Manual does not explicitly list detention basins as acceptable stormwater quality control measures.

The On-Site Guidance Manual method applies a different approach than the Sato method. Whereas the objective of the Sato method is to capture a large percentage of stormwater runoff over a long period of time, the primary control strategy for the On-Site Guidance Manual methods is to treat the first flush flow or volume of the stormwater runoff. This approach is based on the theory that much of the stormwater pollutants are transported from the watershed in the first part of a storm event. Stormwater in excess of the first flush flow or volume is diverted around or through the stormwater quality control measure without treatment.

Table 2 is a summary of the features of the volume-based criteria of the On-Site Guidance Manual method. Also in Table 2 is a comparison of the volume-based criteria of the On-Site Guidance Manual method with other design methods allowed under the Sacramento MS4 Permit. Tables 5 and 6 present a comparison of the results of using the various volume-based design methods for storm separations of 24 and 48 hours, respectively. Comparisons of the On-Site Guidance Manual method and the other volume-based design criteria are described below. The flow-based design criteria are described separately below in Section 2.3.

Table 5
Comparison of Design Volumes Calculated for Stormwater Quality Control Measures
Using Various Criteria—24-Hour Separation Interval

Variable	On-Site Guidance Manual Method	Sato Method	CASQA Method	WEF/ASCE Method	85th Percentile Method
<i>Runoff Coefficient</i>	Not Applicable	0.2	0.2	0.2	Not Available
Volume Capture Percentage	Not Available	87	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	0.27	0.11	0.18	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	-46	-78	-64	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.4	0.4	0.4	Not Available
Volume Capture Percentage	Not Available	89	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	0.58	0.2	0.36	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	16	-60	-28	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.6	0.6	0.6	Not Available
Volume Capture Percentage	Not Available	88	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	0.87	0.30	0.54	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	74	-40	8	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.9	0.9	0.9	Not Available
Volume Capture Percentage	Not Available	89	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	1.31	0.46	0.81	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	62	-8	62	Not Applicable

Table 6
Comparison of Design Volumes Calculated for Stormwater Quality Control Measures
Using Various Criteria—48-Hour Separation Interval

Variable	Guidance Manual for On-Site Stormwater Quality Control Measures	Sato Method	CASQA Method	WEF Method	85th Percentile Method
<i>Runoff Coefficient</i>	Not Applicable	0.2	0.2	0.2	Not Available
Volume Capture Percentage	Not Available	76	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	0.29	0.17	0.22	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	-42	-66	-56	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.4	0.4	0.4	Not Available
Volume Capture Percentage	Not Available	81	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	0.70	0.3	0.45	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	40	-40	-10	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.6	0.6	0.6	Not Available
Volume Capture Percentage	Not Available	81	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	1.00	0.42	0.67	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	100	-16	34	Not Applicable
<i>Runoff Coefficient</i>	Not Applicable	0.9	0.9	0.9	Not Available
Volume Capture Percentage	Not Available	80	80	Not Available	Not Available
Design Unit Pond Volume (in.)	0.5	1.47	0.66	1.01	Not Available
Percent Difference in Design Volume Compared to On-Site Guidance Manual Method	Not Applicable	194	32	102	Not Applicable

2.3.1 Comparison of the Volume-Based On-Site Guidance Manual Method and the 2003 CASQA Method

The design criteria in the 2003 California BMP Handbook are different than the criteria of the On-Site Guidance Manual. The two criteria are compared in Table 5. The CASQA method from the 2003 California BMP Handbook is a capture curve approach, as shown in Figures 3 and 4. The design volume for the CASQA method is the volume at which an 80 percent capture rate is achieved. This design volume varies by *C*-value. The On-Site Guidance Manual method specifies a constant 0.5-inch design volume per unit area for all conditions.

Tables 5 and 6 present a comparison of the results of using the On-Site Guidance Manual method and the CASQA method for storm separations of 24 and 48 hours, respectively. The CASQA method yields unit design volume capacities (depth per unit of watershed area) that are in almost all cases substantially lower than those unit design volumes computed using the On-Site Guidance Manual method. For only one case, a *C*-value of 0.9 and a storm separation interval of 48 hours, did the CASQA method yield higher results—0.66 inch versus 0.5 inch for the On-Site Guidance Manual. A *C*-value of 0.9 would be representative of an almost completely impervious watershed. Therefore, as compared to the CASQA method, in general, the On-Site Guidance Manual method would yield basins designed with larger storage volumes. Because these basins would likely be designed to release small storm events more quickly, the larger storage volumes would not necessarily provide higher levels of water quality treatment. The On-Site Guidance Manual method does not comply with the requirements of the CASQA method for some land-use conditions.

2.3.2 Comparison of the Volume-Based On-Site Guidance Manual Method and the WEF/ASCE Method

The design criteria in the WEF/ASCE method are different than the criteria of the On-Site Guidance Manual. The two criteria are compared in Table 2. The WEF/ASCE method is based on a capture curve approach. The design volume for this method varies by *C*-value. The On-Site Guidance Manual method specifies a constant 0.5-inch design volume per unit area for all conditions.

Tables 5 and 6 present a comparison of the results of using the On-Site Guidance Manual method and the WEF/ASCE method for storm separations of 24 and 48 hours, respectively. The WEF/ASCE method yields unit design volume capacities (depth per unit of watershed area) that are lower for *C*-values less than approximately 0.6 and higher unit design volumes for *C*-values greater than 0.6. The On-Site Guidance Manual method does not comply with the requirements of the WEF/ASCE method for some land-use conditions.

2.3.3 Comparison of the Volume-Based On-Site Guidance Manual Method and the 85th Percentile Method

Using the design criteria listed in Section C.19.c.i.a of the Sacramento MS4 Permit (85th Percentile method), a detention basin would be designed to capture entirely the volume of runoff produced from a 24-hour, 85th percentile storm event as determined from the local historical precipitation record. This method is different than the On-Site Guidance Manual method. The two criteria are compared in Table 2.

The methods are similar in that they are based on capturing a single sized storm event. However, the On-Site Guidance Manual method requires that measures be designed for 0.5 inch of runoff, whereas the 85th Percentile method requires that measures be designed for a certain sized precipitation depth. The translation from precipitation to runoff is not specified for the 85th Percentile method. Also, this design precipitation would need to be developed for the Sacramento area. Therefore, the capture rate and design volume that would result from using the 85th Percentile method is unknown, as is that for the On-Site Guidance Manual method. Furthermore, to use the 85th Percentile method, the Sacramento MS4 Permittees would need to select a hydrologic method to convert from precipitation depth to runoff volume. More work would need to be done to determine whether the On-Site Guidance Manual method complies with the 85th Percentile method.

2.3.4 Comparison of the Flow-Based On-Site Guidance Manual Method and Other Acceptable Methods

A flow-based design is used for stormwater quality control measures such as vegetative swales and diversion structures of off-line structural stormwater quality control measures. The On-Site Guidance Manual provides flow-based criteria that require design for runoff produced by a 2-year, 6-hour storm event. The intensity of such a storm event is listed as 0.18 inch/hour in Table 4-2 of the Hydrology Standards. The On-Site Guidance Manual provides the rational method to convert this precipitation intensity to a runoff peak flow rate.

Section 19.C.ii.a of the Sacramento MS4 Permit requires that flow-based measures be designed for the maximum (peak) flow rate of runoff produced by the 85th percentile hourly precipitation intensity multiplied by a factor of two, referred to here as the flow-based 85th Percentile method. This criterion is the same as the one prescribed by the 2003 California BMP Handbook, the flow-based CASQA method. From Appendix D of the 2003 California BMP Handbook, the 85th percentile hourly precipitation intensity is approximately 0.09 inch/hour for the Sacramento gage. Multiplying by two, the required intensity is 0.18 inch/hour. This intensity is by coincidence the same as required for the On-Site Guidance Manual. The flow-based On-Site Guidance Manual method complies with both the flow-based 85th Percentile method and with the flow-based CASQA method. However, if the hydrology of the Sacramento gage

changes, which is not likely, the flow-based On-Site Guidance Manual method could fall out of compliance.

The Sacramento MS4 Permit also does not list any preferred method for converting the design precipitation intensity to a runoff flow rate. Both the On-Site Guidance Manual and the 2003 California BMP Handbook for the CASQA method provides the rational method to convert the design precipitation intensity to a runoff peak flow rate.

Section 3

Conclusions and Recommendations

This section presents conclusions and recommendations based on the analysis presented in Section 2.

3.1 Comparison of Precipitation Statistics for the Sato Method

The precipitation statistics originally prepared by Sato for the period of 1963 to 1990 and those prepared by CDM for the periods of 1936 to 2002 and 1963 to 2002 are nearly identical. This comparison of statistics suggests that use of any of these three precipitation records would result in similar stormwater quality basin storage design curves and there is no reason to update the Sato method solely to account for differences in the precipitation record.

In the future, the Sacramento MS4 Permittees might consider performing a similar analysis for precipitation gages in the eastern portion of the County to determine if the use of these gages would result in significantly different design curves.

3.2 Comparison of the Current Design Criteria with Other Design Criteria Allowable Under the NPDES Permit

3.2.1 Volume-Based Criteria Comparisons

Comparison of the Sato Method and the CASQA Method. For the same *C*-value, application of the CASQA method results in unit basin design volume capacities (depth per unit of watershed area) that are more than 50 percent lower than unit basin design volume capacities computed using the Sato method. However, the Sato method, although yielding larger design volume capacities, does comply with the CASQA method.

Comparison of the Sato Method and the WEF/ASCE Method. For the same *C*-value, application of the WEF/ASCE method results in unit basin design volume capacities (depth per unit of watershed area) that are approximately one third lower than unit basin design volume capacities computed using the Sato method. However, the Sato method, although yielding larger design volume capacities, does comply with the WEF/ASCE method.

Comparison of the Sato Method and the 85th Percentile Method

The capture rate and design volume that would result from using the 85th Percentile method is unknown, as is that for the On-Site Guidance Manual method. In order to use the 85th Percentile method, the Sacramento MS4 Permittees would need to

develop a hydrologic method to convert from precipitation depth to runoff volume. More work would need to be done to determine whether the Sato method complies with the 85th Percentile method.

Comparison of the Volume-Based On-Site Guidance Manual Method and the CASQA Method

For typical *C*-values, use of the CASQA method results in unit basin design volume capacities (depth per unit of watershed area) that is in almost all cases lower (i.e., up to 78 percent lower) than unit basin design volume capacities computed using the On-Site Guidance Manual method. For only one case, a *C*-value of 0.9 and a draw down period of 48 hours, did the CASQA method yield higher results—0.66 inch versus 0.5 inch for the On-Site Guidance Manual. The On-Site Guidance Manual method does not comply with the requirements of the CASQA method for some land-use conditions.

Comparison of the Volume-Based On-Site Guidance Manual Method and the WEF/ASCE Method

For *C*-values less than 0.6, use of the WEF/ASCE method yields unit design volumes (depth per unit of watershed area) that are lower than unit design volumes computed using the On-Site Guidance Manual method. For *C*-values greater than 0.6, the WEF/ASCE method yields higher results. The On-Site Guidance Manual method does not comply with the requirements of the WEF/ASCE method for some land-use conditions.

Comparison of the Volume-Based On-Site Guidance Manual Method and the 85th Percentile Method

The capture rate and design volume that would result from using the 85th Percentile method is unknown, as is that for the On-Site Guidance Manual method. In order to use the 85th Percentile method, the Sacramento MS4 Permittees would need to develop a hydrologic method to convert from precipitation depth to runoff volume. More work would need to be done to determine whether the On-Site Guidance Manual method complies with the 85th Percentile method.

3.2.2 Flow-Based Criteria Comparisons

Comparison of the Flow-Based On-Site Guidance Manual Method and other Acceptable Methods

Section 19.C.ii.a of the Sacramento MS4 Permit requires that flow-based measures be designed for the maximum (peak) flow rate of runoff produced by the 85th percentile hourly precipitation intensity multiplied by a factor of two, referred to here as the flow-based 85th Percentile method. This criterion is the same as the one prescribed by the 2003 California BMP Handbook, the flow-based CASQA method. The 85th percentile hourly precipitation intensity multiplied by two is 0.18 inch/hour. This intensity is by coincidence the same as required for the On-Site Guidance Manual. The flow-based On-Site Guidance Manual method complies with both the flow-based 85th Percentile method and with the flow-based CASQA method. However, if the hydrology

of the Sacramento gage changes, which is not likely, the flow-based On-Site Guidance Manual method could fall out of compliance.

3.3 Recommendations for Updating Numeric Sizing Criteria

- To comply with the requirements under the Sacramento MS4 Permit, it is recommended that the 2003 California BMP Handbook and the CASQA methods, both volume-based and flow-based, be used as the basis for one centralized stormwater quality control measure guidance manual for both on-site- and regional-sized measures. This approach would also establish a consistent basis for plan review and compliance, provide a measure of equality in stormwater quality control measure implementation, facilitate evaluation and improvement of stormwater quality control technologies, and reduce confusion as to which manual is applicable to which design situation.
- As shown in Table 2, both the CASQA and the Sato methods are applicable to relatively small drainage areas, that is to say, on-site drainage areas. This limitation exists because both methods are based on simplified hydrologic models. They both yield more accurate results for smaller watersheds and less accurate results, in general, for larger watersheds. For larger watersheds and regional stormwater quality control measures, they are excellent planning tools. However, a more detailed hydrologic analysis with more sophisticated flow routing, such as can be done with the SWMM modeling software, should be required for the final design for regional structural stormwater quality control measures.

Section 4

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